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THE AGRICULTURAL GAZETTE OF CANADA

Vol. XI January-February, 1924 No. 1

LEADING TOPICS

National Dairy Show
World's Dairy Congress
Dominion Dairy Conference
Admission of Canadian Cattle to Great Britain
Canada's Agricultural Products and the British Market
Bovine Tuberculosis: The Restricted Area Plan of Eradication
Regulations under the Destructive Insect and Pest Act
Seed and Dairy Regulations
Horticultural Service, Province of Quebec
Progress and Trend of Agriculture in British Columbia
Dairying in Saskatchewan
Agricultural Education—Ontario
Canadian Live Stock Industries

STORAGE

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA

The Agricultural Gazette of Canada is published bi-monthly, in English and in French, by the Dominion Department of Agriculture, Ottawa.

The aim of The Agricultural Gazette is to provide a source of information as to the policies and activities of the Dominion Department of Agriculture and of the Provincial Departments of Agriculture and of Education, so far as the work of the latter relates to Agricultural Education. Besides being a publicity medium, it constitutes a comprehensive record of the progress and development of departmental effort on behalf of Agriculture in Canada.

The Agricultural Gazette is not intended for general distribution. It is sent free to official workers and teachers, including school teachers who have agricultural teaching qualifications; to members of parliament; to libraries; to the Press; to Immigration and Trade agents, and, as an exchange, to agricultural institutions in other parts of the Empire and in foreign countries.

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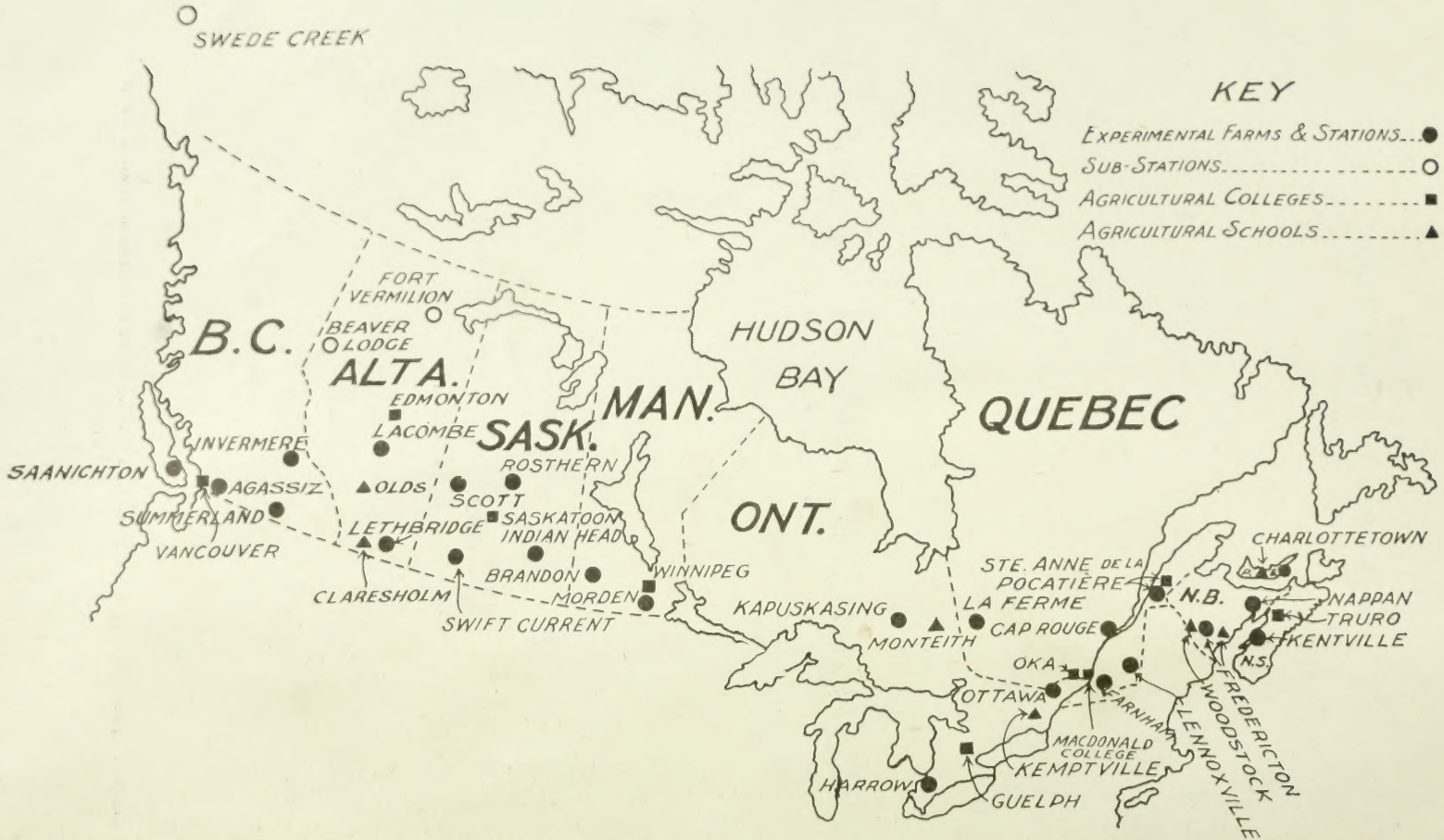
DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
PUBLICATIONS BRANCH

Vol. 11: No. 1 January-February, 1924

The AGRICULTURAL GAZETTE
OF CANADA

J. B. SPENCER, Director of Publicity
Wm. B. VARLEY, Editor

Issued by authority of the Honourable W. R. Motherwell, Minister of Agriculture
OTTAWA



MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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The AGRICULTURAL GAZETTE
OF CANADA

VOL. XI JANUARY-FEBRUARY, 1924 No. 1

NATIONAL DAIRY SHOW

THE seventeenth National Dairy Show, held at Syracuse, N.Y., U.S.A., in October, 1923, is said to have comprised the greatest exhibit of dairy cattle ever gathered together in any country. In three out of the five leading dairy breeds, Canada had representation in every class. In the State Herd Competition, Canadian breeders of Holstein-Friesian, Jersey and Ayrshire cattle distinguished themselves by winning the coveted first place for each breed against all comers. In this competition ten animals from a state or province constitute a herd, not more than two animals being contributed by one breeder. In the Holstein-Friesian and Jersey herds the Province of Ontario won first, while the premier Ayrshire herd award went to the Province of Quebec.

To Canadian Holsteins goes the distinction of holding the State Herd championship, in addition to the official production championship.

The Jersey herd win constitutes the second for the Province of Ontario at this Show in the space of three years. With five states represented at Syracuse the order of the awards was, Ontario, Connecticut, New Jersey, Massachusetts and New York.

While the achievement in the herd competition was most noteworthy, Canadian breeders secured a creditable proportion of the awards in other classes with widely distributed winnings. These included the Holstein Junior Championship, and the Senior and Grand Championship in the female section for Ayrshires.

The achievement of Canadian dairy cattle at the National Dairy Show of 1923 is an outstanding one. It demonstrates that Canadian animals of the leading dairy breeds are among the best that this continent can produce. Those breeders who contributed to the result have done more than could be accomplished by any other means to secure recognition of this fact. They may well be proud of their efforts, and are to be congratulated on the successful outcome.

THE WORLD'S DAIRY CONGRESS

By J. A. RUDDICK, Dairy Commissioner

THE World's Dairy Congress, which was opened at Washington, D.C., on October 2nd, continued at Philadelphia, Pa., on October 4th, and concluded at Syracuse, N.Y., October 5-10th, was in reality the seventh of such events. The first six, known as International Dairy Congresses, were held in Europe under the auspices of the International Dairy Federation, with headquarters in Belgium. At the time this last congress was proposed, the Federation was not prepared to function; consequently the United States government agreed to assume the responsibility of organization and to invite the rest of the world to participate. Forty-three countries accepted the invitation and sent official delegates. Every important dairying country was represented except New Zealand. Some 800 delegates, foreign and American, registered at Washington, and many more at Philadelphia and Syracuse.

The two sessions in Washington were held in that fine auditorium known as Continental Hall. Secretary Hughes gave the address of welcome on behalf of the United States Government. Mr. Herbert Hoover spoke in the dual capacity of Secretary of Commerce and President of the American Child Health Association. He made a most emphatic pronouncement as to the value of milk and its products in the diet. Henry C. Wallace, Secretary of Agriculture, also addressed the delegates, and on the afternoon of October 3rd they were received and addressed by President Coolidge at the White House. Thus the industry and the programme of the Congress received full official recognition.

The other addresses at Washington were of general character, and were intended to form a sort of background for the more technical papers that were presented at Syracuse. The writer had the honour of being asked to give a paper at Washington on the "International Trade in Dairy Products."

An interesting function at Washington was the International Banquet, the chief feature of which was the roll call of the nations by Dr. C. W. Larsen, Chief of the Dairy Division. This afforded an opportunity for flag waving and playing of national anthems. No mention of the days in Washington would be complete without reference to the generous hospitality of the local committee. The delegates were taken to see many beautiful and historic places in and near Washington.

Leaving Washington at midnight of October 3rd in five special trains, the delegates found themselves at "Philadelphia in the morning," and at the beginning of a wonderful day, thanks to the National Dairy Council and the good people of the Quaker City. The great work of the National Dairy Council in and around Philadelphia was fully demonstrated. A big banquet, at which Governor Pinchot was the principal speaker, concluded the day's proceedings, after which we were taken back to the trains and tucked into our berths. Next morning we were at Syracuse to begin the real work of the Congress and to see the National Dairy Show, which was being held at the same time, but which was quite distinct from the Congress.

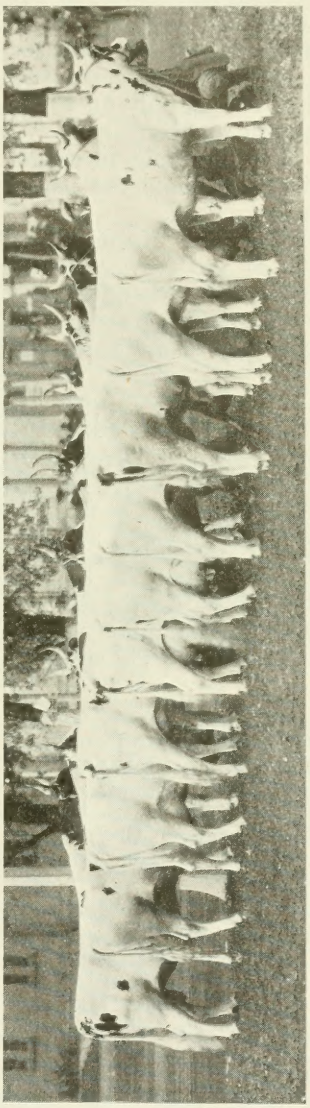
There were 27 sessions of the Congress held at Syracuse, 5 sessions being held concurrently in different auditoriums within a short distance of each other. By means of blackboard bulletins the delegates in any section were kept constantly advised as to what was going on in all the other sections. Every paper was

numbered, and the use of certain signs and marks informed delegates what papers had beeen read, what was being read, and the one that was to follow in all the other sections.

The 207 papers on the programme at Syracuse were grouped according to subjects, each subject occupying one full session. The subjects were as follows:—

The Use of Evaporated, Condensed and Dried Milk in the Dietary;
Business Organization;
Cheese Problems;
Extension Methods in Dairy Education;
Conference on Dairy Publications;
The Nutritional Value of Milk;
Ice Cream Problems;
Methods of Improving and Protecting the Milk Supply;
Instruction in Dairying in Educational Institutions;
Conference on Dairy Publications (Second Session);
Methods of Educating the Public to the Value of Milk;
Co-operative Marketing of Milk;
Control of the Quality of Manufactured Products;
Transportation of Milk;
Milk in the Diet;
City Milk Problems;
Co-operative Marketing of Manufactured Products;
Butter Problems;
Milk Secretion and the Nutrition of Dairy Cows;
Chemistry and Bacteriology of Milk;
Equipment: Materials and Standardization;
Condensed Milk and Milk Powder;
Control of the Quality of Milk;
Breeding Methods;
Diseases of Dairy Cattle.

The outstanding feature of the Congress was the prominence given to health and nutritional topics. The reading of papers at one session by four of the world's leading nutritional experts, all of whom advocated a greater use of milk, was a fact of enormous importance to the industry. Indeed the Congress was almost as much of a health and nutrition event as it was a gathering in the interest of pure dairying.



Ayrshire Herd from the Province of Quebec, first in the State Herd Contest, National Dairy Show, 1923, Syracuse, N.Y.

There were a large number of delegates at the Congress from Great Britain, representing the Departments

of Health and Agriculture and various organizations. It was the first international dairy congress that the British Government has ever recognized or been represented at officially. These delegates have gone back home determined to put into practice some of the methods that have been employed so successfully on this side of the Atlantic in promoting a greater use of milk and milk products. One can hardly estimate the results that may follow.

President Van Norman, and the members of the various committees, are to be congratulated on the manner in which the congress was planned, and on the foresight which had provided so much detail in advance. Their efforts have resulted in a notable contribution to Dairy Progress. Dr. L. A. Rogers, Dairy Division, Washington, Chairman of the Programme Committee, deserves special mention.

Canada was well to the front at both the Congress and the Dairy Show. No other "foreign" country sent nearly as many delegates, and Canadians had a prominent place on the regular programme and at the numerous functions of a more or less social character. The prizes won at the Show by Canadian dairy cattle were very notable.

DOMINION DAIRY CONFERENCE

THE Dominion Dairy Conference, called by authority of the Hon. W. R. Motherwell, Minister of Agriculture, was held at Ottawa, November 29, 30, and December 1, 1923. All the dairy organizations in the Dominion were invited to send delegates. There were, in all, sixty-four in attendance, and the Conference is regarded as the most representative of any hitherto held in Canada in connection with the dairy industry.

The list of appointed delegates follows:—

LIST OF DELEGATES

MINISTERS OF AGRICULTURE

*Hon. J. E. Caron, Quebec.
*Hon. Jas. Martin, Ontario.
*Hon. C. M. Hamilton, Saskatchewan.
Hon. Geo. Hoadley, Alberta.
Hon. John H. Myers, Prince Edward Island.

DEPUTY MINISTERS OF AGRICULTURE

*Dr. David Warnock, Victoria, B.C.
*H. A. Craig, Edmonton, Alta.
F. H. Auld, Regina Sask.
*J. H. Evans, Winnipeg, Man.
W. Bert. Roadhouse, Toronto, Ont.
*J. Ant. Grenier, Quebec, P.Q.
Harvey Mitchell, Fredericton, N.B.
*Dr. M. Cumming, Secretary for Agriculture, Truro, N.S.
*W. Boulter, Secretary for Agriculture, Charlottetown, P.E.I.

MEMBERS OF PARLIAMENT

*L. S. Rene Morin, St. Hyacinthe, Que.
W. F. Kay, Phillipsburg, Que.
*J. W. Kennedy, Apple Hill, Ont.
John L. Stansell, Straffordville, Ont.

PROVINCIAL DAIRY BRANCHES

Prince Edward Island: W. J. Reid, Director of Agricultural Instruction, Charlottetown.
Nova Scotia: W. A. MacKay, Dairy Superintendent, Truro.
New Brunswick: J. R. Sutherland, Dairy Superintendent, Sussex.
Quebec: Geo. Cayer, Dairy Produce Grader, St. Hyacinthe; E. Bourbeau, General Cheese and Butter Inspector, Quebec.
Ontario: G. A. Putnam, Director of Dairy Instruction, Toronto: G. G. Publow, Chief Dairy Instructor Eastern Ontario, Kingston; F. Herns, Chief Dairy Instructor Western Ontario, London.
Manitoba: L. A. Gibson, Dairy Commissioner, Winnipeg.
Saskatchewan: Percy E. Reed, Dairy Commissioner, Regina.
Alberta: C. Marker, Dairy Commissioner, Edmonton.
British Columbia: Henry Rive, Dairy Commissioner, Victoria.

DAIRY SCHOOLS

St. Hyacinthe, Que.: Dr. A. T. Charron, Director.
Kingston, Ont.: L. A. Zufelt, Superintendent.
Guelph, Ont.: H. H. Dean, Professor of Dairying.
Winnipeg, Man.: R. W. Brown, Professor of Dairy Husbandry.

DAIRYMEN'S ASSOCIATIONS

Prince Edward Island: J. H. Simpson, Bay View; J. S. Cousens, Park Corner.
Nova Scotia: W. J. Bird, Department of Agriculture, Truro; C. R. DeLong, Barss' Corners.
New Brunswick: A. J. Gaudet, St. Joseph; Heber Huggard, Norton.
Quebec: J. H. Crepeau, St.-Camille; Raoul Dumaine, St-Francois-du-Lac; Alexandre Dion, Department of Agriculture, Quebec.
Eastern Ontario: G. A. Gillespie, Peterborough; Alex. McGruer, Brinston's Corners; Wm. Newman, Lorneville.
Western Ontario: Jas. Newbigging, Atwood; W. G. Medd, Exeter; Thos. Ballantyne, Stratford.
Manitoba: Alex. McKay, Winnipeg; Thos. H. Rumbal, Miami.
Saskatchewan: J. A. Caulder, Moose Jaw; B. H. Thomson, Boharm.
Alberta: J. P. Donald, Edmonton; N. S. Smith, Olds.
British Columbia: W. J. Parks, Vancouver; P. H. Moore, Essondale.

MONTREAL PRODUCE MERCHANTS' ASSOCIATION

P. W. McLagan, 720 St. Paul St. West, Montreal.
E. H. Hodgson, c/o Hodgson, Rowson & Co., Montreal.

UNITED DAIRYMEN CO-OPERATIVE

W. W. Moore, Harbour Cold Storage, Montreal.

CO-OPERATIVE FEDEREE DE QUEBEC

J. Arthur Paquet, 114 Rue St. Paul Est, Montreal.

THE CANADIAN CREAMERY ASSOCIATION OF ONTARIO

Charles Johnston, Ontario Creameries, London, Ont.
H. S. Johnston, Lindsay, Ont.

CANADIAN PRODUCE ASSOCIATION

Jas. T. Madden, 90 Colborne St., Toronto.
E. J. Smith, Whyte Packing Co., Brockville.

ONTARIO MILK PRODUCERS' ASSOCIATION

E. H. Stonehouse, 186 King St. W., Toronto.

*Unable to attend.

NATIONAL DAIRY COUNCIL

F. M. Logan, Saskatchewan Co-operative Creameries Ltd., Regina.

DELEGATES AT LARGE

Prof. A. Leitch, Department of Agricultural Economics, O.A.C., Guelph.
J. H. Scott, Official Butter Grader, Municipal Abattoir, Toronto.
Avila Caza, St. Anicet, Que.
Nap. Charest, c/o J. J. Joubert, 975 St. Andre St., Montreal.
Frank Boyes, Dorchester Station, Ont.
F. J. Knight, Foxboro', Ont.
P. Pallesen, Central Creameries, Calgary, Alta.
*Georges Bouchard, M.P., Ste. Anne de la Pocatiere, P.Q.

The delegates were apparently convinced of the necessity for active measures to promote high standards in the dairy industry, and showed an earnest desire to grapple with the present dairy situation so as to bring about the necessary improvements.

There were long discussions on the various items of the Agenda, of which reports have appeared in the daily papers, and more detailed reports will appear in the agricultural press.

The following resolutions and reports of Committees were presented and adopted:—

Uniform Dairy Legislation

The question of uniform provincial dairy legislation was brought up and after much discussion the following resolution was moved by Mr. F. M. Logan, seconded by Mr. N. S. Smith, M.L.A., and unanimously carried:—

WHEREAS it would appear that uniform dairy legislation throughout the provinces of Canada would be of great benefit to the industry;

AND WHEREAS this Conference hereby approves of the principle as far as the same is practicable: Therefore be it

RESOLVED, That a Committee be appointed to prepare a model Dairy Bill and regulations, and that the following constitute such Committee: The Federal Dairy and Cold Storage Commissioner, the Dairy Commis-

sioners or the head of the Dairy Division for each province, with power to add to their numbers.

FURTHERMORE, that the Federal Dairy and Cold Storage Commissioner is hereby requested to provide a Secretary for the work of the Committee, and to report as soon as possible.

Report of Cream Grading Committee

The expressed opinion of the Conference was unanimously in favour of the grading of cream. The following report was presented by Mr. Joseph Gaubler, Sask., who moved its adoption, seconded by Mr. E. H. Stonehouse, Ontario, and unanimously concurred in by all present:—

RESOLVED, That this Conference is in favour of and recommends compulsory grading of cream. The Conference also recommends the adoption by all provinces of the following cream grading standards, which are now in effect and have been in effect for some time in several of our provinces and are as follows:—

(A) TABLE CREAM

This grade shall include any lot of sweet, clean-flavoured, non-frozen cream bought for re-sale for household use and which is produced under conditions that comply with the special requirements of the municipality in which it is to be sold for consumption. The acidity of cream in this grade shall be not more than twenty one-hundredths of one per cent (.20%) at the time of grading. The term "Table Cream" may be supplemented by the trade terms "Inspected" or "Extra Special" as the initial purchaser may in each case uniformly adopt.

(B) SPECIAL GRADE

This grade shall include any lot of cream which is clean in flavour, of uniform consistency and fit for making into Special Grade butter. The acidity of cream in this grade shall not be more than thirty one-hundredths of one per cent (.30%) at the time of being graded at the creamery where it is to be manufactured into butter.

(C) FIRST GRADE

This grade shall include any lot of cream which is reasonably clean in flavour, of uniform consistency and fit for making into butter of this grade. The acidity of cream in this grade shall not be more than sixty one-hundredths of one per cent (.60%) at the time of being graded at the creamery where it is to be manufactured into butter.

(D) SECOND GRADE

This grade shall include any lot of cream that does not meet the requirements specified for the next higher grade; such as cream which is butter, stale, musty, metallic, or otherwise unclean in flavour.

(E) OFF GRADE

This grade shall include any lot of cream with a very objectionable odour or flavour, such as kerosene, gasoline, stinkweed, onions or such other flavours as may render cream unfit for making into second grade butter.

THAT to ensure the safe-guarding of the reputation of Canadian butter on the markets of the United Kingdom, in case all provinces do not find it feasible to adopt compulsory cream grading and the standards hereinbefore set forth, this Conference further recommends that the Federal Department put into effect as soon as possible the following export regulations regarding butter, viz:—

1. That federal grade certificates shall not be issued on any butter which does not score first or better at the time of export;

2. That no certificate shall be issued for butter made from cream which has not been properly pasteurized.

Size of Dairy Factories

The size of dairy factories was very fully discussed, and while it was generally conceded by those present that the increasing number of small factories was a menace to the dairy industry, it was also felt that at present nothing definite could be done to overcome this drawback, but the following resolution was moved by Prof. Leitch, seconded by Mr. L. A. Gibson, and unanimously carried:—

WHEREAS the perpetuation and continuance of the small cheese factory and creamery is a decided menace to the industry as well as a source of much financial loss;

AND WHEREAS it is neither feasible nor advisable to regulate the size of any such manufacturing plant by any form of Government action;

AND WHEREAS the only possible method of control of this important factor is the spreading of knowledge of the certain financial outcome of the operation of minimum-sized factories;

AND WHEREAS this knowledge can come only from a study of the business operations of representative factories now in operation: Therefore be it

RESOLVED, That the Federal Department of Agriculture be urged to take such steps in co-operation with the Provincial Departments of Agriculture, as will make this needed information available to those whose duties and responsibilities are therewith concerned.

Guarantee of Quality

The question of cheese and buttermakers being required to guarantee a No. 1 cheese or butter having been duly discussed, the following resolution was moved by Mr. A. E. McGruer, seconded by Mr. W. W. Moore, and unanimously carried:—

BE IT RESOLVED, That while this Conference recognizes that there should be some safeguard against carelessness or inefficiency on the part of the cheese or butter-maker, it is the opinion of this Conference that the existing custom of requiring cheese and buttermakers to guarantee a No.

Holstein-Friesian Herd from the Province of Ontario, first in the State Herd contest, National Dairy Show, 1923, Syracuse, N.Y.

l product is not in the best interest of the dairy industry, inasmuch as it opens the way to improper practices, and often makes it more difficult to effect an improvement in quality in the individual factories.

Green Cheese

The shipping of green cheese and the resultant injury to the Canadian cheese trade was fully discussed and comparisons were made with the practices in other countries. It was shown that our chief competitor requires by law that cheese shall be fourteen days old before it is graded, notwithstanding the fact that three months must elapse before it can be placed on the market.

While no resolution was submitted to the Conference on this subject, the concensus of opinion was in favour of more time being given for the cheese to mature before being shipped overseas.

Regulation 12 under *The Dairy Produce Act* provides that no cheese shall be graded until it is sufficiently matured in the judgment of the grader to permit the quality being properly determined. It seemed to be the general opinion of the Conference that the enforcement of this section of the regulations would tend to correct the abuse of shipping green cheese.

Loading Warm Butter

The injurious practice of loading warm butter into refrigerated space on steamers along with butter that has been thoroughly chilled or frozen, was one of the important subjects brought under discussion. Representatives of the railways and steamship companies were present, and explained their side of the case to the Conference. Mr. J. F. Singleton, Chief, Markets Division in the Branch, produced a large number of figures giving the temperatures of butter as loaded on steamers, and thermograph records showing the temperatures maintained in the ships' refrigerators during the voyage to the United Kingdom.

The following resolution was moved by Mr. F. M. Logan, of the Saskatchewan Creameries Company, Regina, and seconded by Mr. Alex, McKay of Winnipeg, and unanimously carried:—

Resolved, That it is advisable for this Conference to go on record as recommending that all butter for export shall register 25 degrees F. or lower, before it goes on board the steamer, and that some regulation be passed to that effect.

ADMISSION OF CANADIAN STORE CATTLE TO GREAT BRITAIN

Following the discussion that took place at the Imperial Conference relating to the interpretation and administration of *The Importation of Animals Act* and the Regulations governing the admission of store cattle from Canada into Great Britain, a memorandum, outlining the proposed concessions, has been received from the British Minister of Agriculture by the Prime Minister of Canada.

The memorandum sets out that while the British Minister of Agriculture cannot surrender the final word in deciding whether any particular animals come within the provisions made for the admission of store cattle into the United Kingdom, at the same time every desire is felt to meet as far as possible the wishes of the Dominion.

Subject to the foregoing proviso, instructions would be given to the

Ministry's Inspectors at the port of entry as follows:

(a) In the case of any cattle which the Inspector is satisfied can reasonably be regarded as suitable for feeding for a further period of not less than 28 days before slaughter, the Inspector will on application grant a license for their removal from the landing place to any special authorized market or other premises, subject only to the conditions embodied in the Schedule to the Importation of Animals Act, 1922.

(b) In the case of cattle where the Inspector is not so satisfied, the Inspector will on application either:

(1) grant a license for their removal to a slaughter-house for slaughter with such conditions as may be considered necessary to secure their slaughter thereat and will not, as at present, require them to be slaughtered at the landing place, or

(2) if the owner of the cattle is prepared to undertake that they will be fed for not less than 28 days before slaughter the Inspector will grant a license for their removal to premises other than a slaughter-house subject to such conditions as may be considered necessary to secure that the undertaking will be observed.

In either case the additional conditions imposed by the Schedule will necessarily apply.

Cattle for which a license is not applied for or in respect of which a license cannot be granted in accordance with these instructions will have to be slaughtered at the landing place as heretofore.

It must be understood that cattle which have not complied with the conditions applicable to stores, i.e., three days' isolation and supervision in Canada and supervision by a veterinary surgeon on the ship, must continue to be landed at an imported animals wharf and not at an imported animals landing place and will accordingly be slaughtered in the wharf. The Ministry has no power to allow such cattle to be moved from the wharf to a slaughter-house.

Jersey Herd from the Province of Ontario, first in the State Herd Contest, National Dairy Show, 1923, Syracuse, N.Y.

The British Minister of Agriculture states that this offer is made with the desire of meeting as far as possible the views presented by the

Canadian representatives, consistently with his primary duty to safeguard the interests of British agriculturists. The request is made that the Canadian Government co-operate in giving instructions to their officers not to certify as store cattle animals that cannot reasonably be regarded as suitable for feeding for the period above referred to. The Minister expresses himself as of opinion that, with good-will on both sides, the Act can be administered satisfactorily.

CANADA'S AGRICULTURAL PRODUCTS AND THE BRITISH MARKET

ON his return from Great Britain at the end of November, 1923, the Deputy Minister of Agriculture, Dr. J. H. Grisdale, issued the following statement as to market conditions in that country and as to the position and outlook for a number of Canada's leading agricultural products at the time of his visit.

Cattle Trade

Commenting upon the situation in general, Dr. Grisdale intimated that Canadian store cattle were making steady progress in the estimation of the British feeder. The stores now being sent over were quite equal, if not superior, to those exported before the institution of the embargo thirty years ago and were likely soon to enjoy as good a reputation as they ever did.

The question of ocean space and carrying charges was still a vexatious one and while immediate improvement does not appear likely, Dr. Grisdale is hopeful that negotiations now in progress both in this country and Great Britain will bring good results.

There is at present a great opening in Great Britain for fat cattle for immediate slaughter and, as a rule, the trade is fairly profitable. It is not a trade that seems likely very shortly to be entirely in the hands of the Canadian exporter since the number going forward from the United States, the only other country taking any part in this trade, has been gradually decreasing year by year. Nor are they likely to be in a position to send more in the future since their own increasing population is practically certain to require all the beef they can produce and more.

As to the stocker trade, I am confident that much more satisfactory progress and more certain and remunerative returns may be anticipated from now forward.

Bacon

Our trade in bacon is I find improving and Canadian bacon seems to be meeting with very considerably less criticism this year than was the case on the occasion of my visit in 1922. Prices were, of course, a little better than at that time, which would account for the improved tone in some measure, but I was informed also, and my own observations led me to believe as well, that the quality of our bacon has improved somewhat in the year that has just passed. This may be due, and I am inclined to think it is due, in some measure at least, to our new hog grading law which went into effect about a year ago. There is, of course, still some bacon of rather inferior quality reaching Great Britain from this country, but the average has improved and the reputation of our Canadian article is certainly getting better. We won out in the London Dairy Show as amongst exhibitors

from the different Dominions and we won out quite easily. Of course, this does not mean a very great deal since none of the other Dominions, save Ireland, are very prominent in this industry; nevertheless it has the effect of improving our reputation and should materially benefit the trade.

The great trouble with our bacon trade is the lack of volume. Canada can never hope to take a very prominent part in the bacon industry so long as she offers the small quantity that she now sends forward. The total amount of bacon sent from Canada to Great Britain constitutes but a very small percentage of the bacon consumed in that country, probably not 10 per cent at the outside. There is no reason why the quantity sent should not be three or four times as great as it is at present. To reach such proportions it would not, of course, be necessary for Canada to produce three or four times as many hogs, since her home consumption is not likely to increase very rapidly and any increase in the bacon output of our packing houses would practically all be available for export, hence an increase of 100 per cent in the number of hogs kept in the country, really a small matter when the present hog population of three or four millions only is considered, would mean an increase of quite possibly 500 or 600 per cent in the quantity of bacon exported to Great Britain. We would then be in a position to take our rightful place in the British market, and would become a real factor in the trade. This, in my opinion, is the objective we should have in mind, and if, in conjunction with such a decided increase in our output we could have improved quality, as we certainly could, then our bacon would, I am confident, command practically the same price as the Danish article, which, in very many cases indeed did not seem to me to be at all superior to the Canadian article, and it was admitted by many of the handlers of bacon in London that there was really very little preference due the Danish bacon so far as quality was concerned. Bacon production is possibly the one line in which the Canadian farmer can make a decided profit at the present time and is the line in which he may be expected to continue to make a profit.

Dairy Produce

Our dairy products, I am sorry to say, do not seem to have made very much progress in the past year, although possibly there is some improvement on the whole, and there seems to be a better feeling amongst the trade than was the case a year ago.

Canadian cheese has been standing up better this year than for some time, and as a rule is commanding a somewhat higher price than its great competitor, the New Zealand article. We were able to carry off first and second in the Dairy Show and the dealers with whom I discussed this trade were of the opinion that we are now sending forward a considerably more uniform article than we had been doing for some little time past. I am inclined to attribute this improvement, in some measure at least, to our grading system of export dairy products put into effect last spring, and the British dealers were of the same opinion. This law, which has been in effect during the past season, is, however, susceptible of improvement, or at least the regulations thereunder can, I believe, be materially improved, and while there may be some little difficulty in persuading some of our people that further control is essential to further progress I am, nevertheless, of the opinion that some additional control will have to be imposed and that it will result in

very decided benefits to the industry generally, and to Canada as a whole.

Our butter trade is very small, and, I regret to say, in rather ill repute. The great diversity in quality and packing very materially affects the price paid, and is the very serious problem now confronting the Canadian dairyman. In fact it is so serious that by instruction of the Minister a convention has been called to discuss ways and means of improving our dairy products as to uniformity in quality and colour. This step is being taken not a day too soon if we would save our butter trade, or, rather, if we would hope to build up a trade with Great Britain where we have really very little at present.

Canadian Eggs

Canadian eggs are still looked upon as an excellent article in Great Britain, but here again the quantity sent forward is very small. Our egg grading regulations are very certainly the most advanced in the world, and will, I am confident, have the ultimate effect of developing this industry, as they have already had the effect of building up for us a very excellent reputation. Unfortunately for us, eggs reach Great Britain from a very great number of countries. On some of the markets one can see eggs from 25 or 30 countries all at the same time. These eggs are sold, in many cases, under no particular name, so far as the retail trade is concerned at least, but Great Britain is contemplating legislation in connection with the marking of goods, and should this legislation be passed, as I anticipate it will be in the near future, then our eggs will be one of the articles to benefit most materially therefrom.

Canadian Apples

I was in London when Canadian apples were coming forward in great quantities to Great Britain and was very pleased to note the general good repute in which they were held. Some of our shippers, however, have been making very serious blunders in sending forward apples rather badly packed, and in shipping forward, also, apples that looked like windfalls. This had the effect of lowering the average price on the British market by some shillings per barrel. It also hurts the general trade and cannot help but work very serious injury to the reputation of our Canadian fruit should the practice be continued. Our reputation has been gradually brought up for a number of years and has received a tremendous boost this year by our most important winnings at the Manchester Fruit show held a few weeks ago when Canada carried off premier honours in the Empire class for apples. The demand for Canadian apples in Great Britain can be very materially increased if the right article is sent forward and properly handled there.

On the whole I am of the opinion that Canadian agricultural products will in the future command more and more the attention of the British consumer and, therefore, of the British commission men. Canada is quite evidently giving more attention to the requirements of the British consumer and to his likes and dislikes than is any other of the Dominions, and than is any other supplier, speaking in a general way. We must not, however, hesitate in our efforts for a moment if we would hold our place and improve the same in these British markets. The British consumer likes what he likes regardless of who will furnish it to him, and any falling off in quantity or quality very quickly reacts to injure still further the trade affected. Our producers and handlers of agricultural products in Canada must not, therefore, expect to have any opportunity of resting on their oars or awaiting developments. Our only chance is constant and strenuous

effort looking to improvement in quality, increase in quantity and regularity in the supply and uniformity in the character of the produce we would sell the Mother Country.

In Great Britain, just as in Canada, the greatest problem to be overcome in connection with profit making on the farm is the cost of distribution of the finished product, and I honestly believe that the burden in this respect is greater in Britain than it is in Canada.

BOVINE TUBERCULOSIS: THE RESTRICTED AREA PLAN OF ERADICATION

By GEO. HILTON, V. S., Acting Veterinary Directory General

THE control of Bovine Tuberculosis has always been a difficult problem, chiefly because of its wide prevalence and the tremendous cost involved, and because it has always been difficult to obtain the general support of live stock owners.

The very character of this disease, and the previous history pertaining to its modes of infection and methods of spreading, indicate very clearly that satisfactory progress in its control and eradication cannot be expected unless the stock owner is interested and co-operates in every possible way with the officers engaged in this work. It has, therefore, been necessary for many years to exercise caution in formulating policies for the control of this disease. Progress has accordingly been limited to the state of public opinion. As stockmen became familiar with the older plans for the control of this disease they commenced to realize that many of the difficulties experienced by them in protecting their clean herds would be materially lessened if tuberculosis were also eradicated from all the herds in the district.

This question became a live one in live stock organizations, and the Western Canada Live Stock Union, at its annual meeting in Regina in December, 1921, devoted the whole of one afternoon session to discussing the question of controlling bovine tuberculosis. As a result of their deliberations, a resolution was passed favouring the adoption of the Restricted Area Plan for the eradication of this disease.

A copy of this resolution was forwarded to the Honourable W. R. Motherwell, Minister of Agriculture, who, after due consideration, decided that the time was opportune to give this more advanced policy a trial and an Order in Council was, therefore, passed on December 11, 1922, providing for Regulations relating to the Establishment and Maintenance of Restricted Areas for the Eradication of Bovine Tuberculosis.

The Restricted Area Plan has for its object the eradication of Bovine Tuberculosis from definite areas. It is a more radical plan than our older policies, as it involves the testing of all classes of cattle in a specified territory and the slaughter of all diseased animals. It is a co-operative plan between the Federal and Provincial Governments and the stock owner, and offers an exceptional opportunity to eradicate this disease from large areas, also their maintenance from it in a practical and economical manner.

The regulations provide that the application for assistance under this plan must be forwarded to the Federal Minister of Agriculture by the Minister of Agriculture of the Province

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in which the area is located. The location and boundaries of the proposed area must be given, the approximate number of cattle within it, and there must also be a statement to the effect that a majority of at least two-thirds of the cattle owners in the area have expressed a desire to have all the cattle in the area tested for the eradication of tuberculosis. Under this plan, therefore, all cattle are systematically tested with tuberculin by Veterinary Inspectors of the Health of Animals Branch. Reactors are permanently earmarked by punching the letter "T" through the right ear, and are valued by the veterinary officer. The maximum value permitted by law for pure-breds is $150 and $60 for grades, and the owner receives two-thirds of the appraised value in compensation in addition to the value of the carcase.

As the essential feature in the eradication of tuberculosis is the separation of the diseased cattle from the healthy ones, and the wider they are separated and the less communication there is between them afterwards, the greater the possibility of establishing clean herds, reactors after having been valued and earmarked are promptly shipped for slaughter under official supervision, and the premises from which they are removed are thoroughly cleansed and disinfected. All herds in which reactors have been found are retested as soon as possible after a sixty day period has elapsed from the date of the cleansing and disinfection of the premises. This procedure is necessary in order to pick out animals in which the disease had not progressed sufficiently to produce a reaction at the previous test, and this is the earliest period at which a retest can be applied with reliable results.

The regulations further provide for the protection of the herds in the area from the introduction of infection from outside sources. Cattle intended to be brought into the area for permanent stay must first be tested with tuberculin by a veterinary inspector, and no cattle are permitted to be brought in for this purpose unless they have passed a satisfactory test.

Untested cattle may be shipped for transit through the area, but, if necessary to unload within the area, they must be unloaded at points specially designated for this purpose, where they can be kept from coming in contact with area cattle.

Untested cattle are not permitted to be driven across the area by road, unless special permission is first received in writing by the veterinary inspector in charge of the area.

Untested cattle may be brought into the area for immediate slaughter, provided they are not allowed to come in contact with area cattle and are kept isolated until slaughtered.

With a view to further protecting the cattle from possible infection, the feeding of by-products of cheese factories, skimming stations and butter factories, is prohibited within an area unless the said by-products have first been sterilized by heat.

The first and only application for assistance under this plan was received soon after the order was passed from the Deputy Minister of Agriculture for the Province of Manitoba, covering an area in the Carman district, consisting of twenty townships. After due consideration the application was accepted and arrangements were made to organize the work of testing all cattle in the area. These tests were commenced on February 1, 1923, and although bad weather conditions made transportation difficult, it was possible, owing to most active co-operation of all the stock owners, to complete the test of all the cattle, numbering 16,435 head, in a period of six weeks, with the employment of eleven veterinary officers.

Nine hundred and eighteen (918) of these cattle reacted, or 5·58 per cent. These were promptly shipped for slaughter to abattoirs under Government inspection, and after the infected premises had been satisfactorily cleansed, disinfected and released, compensation amounting to $32,830 was paid. All herds from which reactors had been removed were tested after a period of sixty days had elapsed. There were 344 of these herds, which contained 5,990 cattle, and 97 reactions were obtained, or 1·6 per cent. The reacting cattle were slaughtered, the premises disinfected and $3,128 was paid in compensation.

The ninety-seven (97) reacting cattle were found on fifty-one (51) premises, and on four of these all the cattle were diseased, leaving forty-seven (47) infected herds to retest after a sixty day interval. At this test two reactors were found on one premises. These animals were slaughtered, the premises disinfected and $49.33 was paid in compensation.

Ten veterinary inspectors were engaged in conducting the second general test of all cattle in the area, and this work was completed in October, having occupied a period of four weeks.

There were 15,600 cattle in the area at this test, and 87 of these reacted, or .55 per cent, for which $3,154 was paid in compensation. These reactors were found on 67 different premises and after they were removed for slaughter the premises were thoroughly cleansed and disinfected.

It will be necessary to retest the herds on these premises as soon as a sixty day period has elapsed.

Experience in dealing with this disease has shown that, with the continued support of the stock men, infection will be ultimately eradicated from this area, but it will require the utmost vigilance and perseverance. Great care will have to be exercised to prevent the introduction of infection from outside sources, and as a tuberculous cow is undoubtedly the most prolific disseminator of infection, cattle for addition to clean herds should be purchased only from herds in which infection has not been found, or from those in which it has been eliminated.

Regulatory measures are essential in suppressing contagious diseases, and, unfortunately, however wisely administered, they are in many cases irksome and cause inconvenience and financial losses to stock owners. No trouble was, however, experienced in conducting this work in the Carman district. The stockmen were willing and anxious to assist in the eradication of this disease, and with their active co-operation it was possible to make satisfactory progress.

This plan affords an excellent opportunity for systematic and methodical work, and enables the testing of the greatest number of cattle in a given period. The prompt slaughter of all diseased cattle and the cleansing and disinfection of all infected premises provide a clean territory for healthy herds, which gives the owners a better opportunity to maintain their herds free from tuberculosis.

The advantages to a stock owner in a restricted area are many. A tuberculosis-free herd is a valuable asset. Tuberculous cows on an average are not so long lived as those free from it. The percentage of digestive and other disorders is much greater in a tuberculous herd, resulting in severe losses through diminished milk supply, and premature deaths are much more frequent. Tuberculous animals are a poor market for the feed produced by the stock raisers, as the same profitable returns cannot be made in feeding tuberculous animals as healthy ones.

The value of a herd is much enhanced by the elimination of tuber-

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publicity and there is a greater demand for animals from such herds. The owner also has the satisfaction of knowing that he is raising cattle free from tuberculosis, and especially so as it is not at all an uncommon thing for this disease to be transferred from cattle to man, and more particularly to young children by means of raw milk. The eradication of tuberculosis is, therefore, not only an economic problem but of great benefit to the public health of the state.

NEW REGULATIONS UNDER THE DESTRUCTIVE INSECT AND PEST ACT

By LEONARD S. McLAINE, Division of Foreign Pests Suppression; Secretary, Destructive Insect and Pest Act Advisory Board, Department of Agriculture, Ottawa

THE complexities that have arisen in the past twenty-five or fifty years in connection with the exchange of commodities throughout the entire world, also the increase in the diversity of established trade routes, and the danger that naturally results from the movement of products infested with pests and diseases have made it necessary for man to take every reasonable precaution to prevent insofar as possible, the introduction of new species of pests and diseases into uninfected areas. Whether it is due to a keener sense of observation on the part of the general public, or whether it may be regarded as an established fact, nevertheless, there has been apparently a great increase in the amount of damage caused by insect pests and plant diseases during the past few decades.

Although it is realized that all the pests responsible for damage on this continent are not of foreign origin, many of our worst enemies are not native to this hemisphere. It is also known that there are many very serious pests present in the older portions of the world which might prove to be most undesirable guests if they were permitted to gain a foothold on our soil. Apparently one of the most feasible means of controlling the introduction of menaces such as these is by enacting laws that restrict or prohibit the importation of products and commodities likely to harbour these insect pests and plant diseases. It has been frequently stated that we on this side of the water are suffering from too much legislation of all kinds and descriptions, and while that may be true, I am afraid that we shall have to continue being burdened by pest legislation, or until such time as it is realized by all nations and peoples that only products free from pests and diseases shall be offered for exchange. A step in this direction was made in 1914 by the International Phytopathological Conference, held in Rome. Unfortunately, the great war made it impossible to continue the discussions or bring into general operation some of the resolutions that were passed at that time.

Questions in relation to legislation, however, were discussed at the recent international conference on entomology and phytopathology, convened by the Dutch Government at Wageningen, Holland, in June, 1923. The Dominion Entomologist, Mr. Arthur Gibson, who attended this conference and took part in the discussions, states that the following resolution was adopted:—

> "The representatives of all nations assembled at this International Entomological and Phytopathological Conference, June 25-30, 1923, at Wageningen, desire to

place themselves on record as in full agreement with the essentials of international trade and commerce in living plants and plant products, namely reasonable freedom from all insect pests and plant diseases of all kind of materials imported into, or exported from any country."

The history of the introduction of the major foreign pests now present on this continent is too well known to need repetition, and it is also recognized that all the pests and diseases were not imported on such products as nursery stock. An excellent example is the European Corn Borer, which circumstantial evidence showed was imported on broom corn from Europe. This has been substantiated by the finding of an outbreak of this insect at one of the ports of importation for broom corn and where it was held for sterilization. As a consequence, pest legislation should be passed and brought into force only after a careful study of the entire situation has been made. This will entail an investigation of the product from its source to its ultimate destination, the trade routes it has to follow and whether it is an essential commodity or not. Until this is done mistakes are likely to be made and disastrous results follow. Crises arise, however, which make it imperative to take immediate action, and financial loss may result, but such cases are very fortunately comparatively infrequent. Care must also be taken to base the legislation on a strictly scientific foundation and not to be influenced by commercial possibilities. This is a point which needs special attention in these days of keen trade rivalry and competition.

Insect legislation in Canada dates back to 1883, when an Act was passed in Prince Edward Island to prevent the spread of the Colorado potato beetle. With the appearance of the San José Scale in British Columbia, legislation was passed in 1894, empowering the Horticultural Board to inspect and treat plants and plant products for pests and diseases. Four years later the first Federal Act was passed, known as the San José Scale Act. This law together with the regulation prohibited the importation of host plants of this insect from the United States, Australia, Japan and the Hawaiian Islands. With the discovery of effective fumigation methods the law was modified in 1900 and permitted the importation of fruit stocks, etc., provided they were treated at one of the several Federal fumigation stations.

As a result of a serious outbreak of the brown tail moth in France, and the finding of many nests on shipments of imported nursery stock, an active campaign was started to inspect all foreign shipments of this character. The following year, 1910, the Destructive Insect and Pest Act was passed and all Federal Legislation since that time has been issued as regulations under this law.

The Act stands as a monument to the men who were responsible for its preparation, for although innumerable regulations have been passed in accordance with its authority, and on all manner of subjects, it has never been necessary to recommend an amendment to the Act itself.

Two years ago it was realized that the question of insect and pest legislation had assumed such a complicated aspect and involved so many different problems, not only as regards plant life, but also trade and manufacturing interests, that in order to better co-ordinate opinion and effort it was deemed advisable to create an Advisory Board to consider such matters. On April 21, 1922, the Destructive Insect and Pest Act Advisory Board was constituted, and five officials of the Department of Agriculture were appointed members.

The Board is not empowered to pass legislation, but may recommend to the Minister of Agriculture any changes that are considered advisable and in the public interest, and in addition, may call upon other officials of the Department of Agriculture or other persons to act in an advisory capacity. Furthermore, the Board does not administer the various regulations under the Act, their administration being left to the Branch particularly concerned.

After careful consideration covering more than two years, including much investigation and advice sought from the horticultural interests from one end of Canada to the other, including public hearings, the Board recommended to the Minister of Agriculture a general revision of the Regulations.

On September 1, 1923, the new regulations went into effect. These consist of a series of general regulations and fifteen foreign and six domestic regulations. The general regulations consist of fourteen sections and are more or less comprehensive, but are of particular interest in that they empower the Department to inspect or examine any plants or plant products offered for entry into Canada and if found infested with pests or diseases they may be refused entry, treated or destroyed. They also are of particular value in connection with the handling of shipments not covered by any special regulation or order, such as grains infested with weevils, broom corn, dried fruits, etc. Provision is also made for the inspection of export shipments, the powers of inspectors, interfering with an inspector in the performance of his duties, holding of infested shipments, the right to trespass, the selling of infested material, the importation of plants for scientific purposes, and the paying of compensation.

The foreign and domestic regulations deal with specific problems; they may be increased in number, amended or modified as occasion demands. They are issued in separate form, and, it is hoped, are worded so as to be readily understood by the general public.

In adopting this form, the Department is of the opinion that the average individual may take a greater interest in the safeguards that have been enacted for his benefit. An inquirer will be able to see just what he may or may not do, without the necessity of wading through endless pages of laws which are of no particular interest to him.

Under the Foreign Regulations the importation of nursery stock from foreign countries is governed. All plants for ornamental purposes or propagation except seeds are now classified as nursery stock, and permits are necessary to import such shipments. Nursery stock from countries other than the United States may enter only through certain ports, and all shipments are subject to inspection. It is hoped by this means to prevent, if possible, the further introduction of noxious pests and diseases.

The foreign regulations also restrict the importation of plants from the Hawaiian Island on account of the Mediterranean Fruit Fly; the importation of nursery stock, forest and quarry products from the New England states on account of the Gipsy and Brown tail moths; the importation of corn, cut flowers and other plants from the European Corn Borer areas in the United States. A total prohibition has been placed on the importation of potatoes from countries and localities infected with the Potato Wart Disease; all five-leaved pines and currants and gooseberries from all parts of the world on account of the White Pine Blister

Rust; chestnuts and chinquapins from Asia and the United States on account of the Chestnut Bark Disease; European buckthorn and certain species of barberries from all countries on account of the Crown Rust of Oats and the Black-stem Rust of Wheat; alfalfa hay from the alfalfa weevil infested districts; plants with soil from Asia on account of the Japanese Beetle and other soil infesting insects; all species and varieties of douglas fir, hemlock, and larch from countries other than the United States on account of the newly discovered Douglas Fir Disease; peach stock and hazel, cob and filbert from certain states into British Columbia on account of Peach Yellows and Eastern Filbert Blight.

The domestic quarantines deal with the movement of nursery stock in the Apple Sucker infected areas in Nova Scotia; the movement of corn from the European Corn Borer areas in Ontario. They also coincide with the foreign regulations, prohibiting the movement of pines and currants and gooseberries into Western Canada from the white pine blister rust areas in the east and similarly with the importation of European buckthorn and certain barberries on the prairies, and peach stock and hazel, cob and filberts into the province of British Columbia from eastern Canada.

REGULATIONS UNDER THE SEEDS ACT, 1923

By CLARK HAMILTON, Assistant Chief, Seed Division

THE Seeds Act of 1923, with regulations made by the Honourable the Minister of Agriculture, provides legislation for the uniform control of the merchandising in Canada for the purpose of seeding, and the importation into Canada for the purpose of selling, of all agricultural and garden seeds.

The regulations supplement and define the application of provisions included under the various sections of the Act, and were recommended to the Minister by an Advisory Board, the personnel of which includes representative seed growers elected by farmers' and growers' organizations and representatives of the Canadian seed trade. This board will be asked to act in an advisory capacity when it is deemed necessary to make changes in the regulations.

The regulations include domestic and export seed grade definitions. Domestic grades have been provided to include all kinds of field and garden seeds used in Canada for seeding purposes, while export grades have been defined to include cereals, clovers and grasses.

The following general definitions apply to seed grades as indicated:—

Domestic Grades.—The minimum quality for seeds that may be sold under the grade names prescribed under Section 3, clause (*e*), of *The Seeds Act* shall be as follows: Registered and Extra No. 1 seed shall consist of a kind, variety and selection approved by the Canadian Seed Growers' Association, and which is true to variety name within the limits hereinafter defined. All grades shall consist of seed which shall (1) within comparative latitudes for different grades, be well matured, sound, sweet and well cleaned and graded to remove small, shrunken, immature or broken kernels and inert matter; (2) be at least equal in general appearance to standard grade samples that may be fixed from season to season by the Advisory Board appointed under the Seeds Act, and (3) comply with the minimum standards set forth in the tables.

Export Grades.—The minimum quality for seeds that may be sold under the export grade names pre-

scribed under Section 8 of *The Seeds Act* shall be as follows: Registered and Extra No. 1 seed shall consist of an approved kind or variety which is true to name. The grades Registered, Extra No. 1, No. 1, No. 2 and No. 3 shall be mature, sound, well cleaned and graded as to size of seed, free from dodder, and contain not more than the maximum percentage of prescribed injurious weed seeds; shall conform approximately to one of the colour standards represented by the type samples specified as W, X, Y, Z, in the seed code, and come within the minimum quality standards set forth in the tables.

These definitions are further supplemented by tables under which the several kinds of seeds are somewhat broadly classified into such groups as the cereals, the clovers, the grasses and the field root and garden vegetable seeds. The table which covers a group sets forth the maximum number and nature of impurities per ounce or per pound consisting of weed seeds both noxious and others, the maximum number or percentage of other crop seeds allowed, and the minimum per cent germination and purity of variety which shall be required for the several grades.

Two grade names, namely, Registered and Extra No. 1, have been added to the grade names No. 1, No. 2 and No. 3 included under provisions of *The Seed Control Act of 1911*. Provision has also beeen made for the grading of mixtures. The matter of purity of variety applies only to seed lots which in other respects are eligible for the grades Registered or Extra No. 1. Before either of these grade names can be given, it is required that a satisfactory statement of per cent purity of variety based on field inspection be furnished to the inspector who makes the final examination of the seed.

The noxious weeds which shall be considered as primary and secondary are named by regulation, also the kinds of weeds, the seeds of which may be deemed as useless when grading clovers, grasses and lawn grass mixtures. A group designated as harmful includes all weeds not already classified as noxious or useless for the purpose of establishing domestic grades. Another group is referred to as injurious weeds and has its application in the giving of export grades.

While grades have been provided for field root and garden vegetable seeds, they are not compulsory. When such seeds are not sold under grade the minimum per cent germination is fixed for each kind of seed below which marking or labelling is required. These minimum percentages range higher than under the old Act.

The procedure to be followed and the implements to be employed in taking official samples, the number of samples that shall be taken and how they shall be forwarded for examination and grade are all fully prescribed.

Seed importation restrictions are now included in the regulations under *The Seeds Act*. Importation regulations apply to all kinds of seeds, and those seeds which are unfit for seeding purposes within the meaning of the Act are prohibited entry into Canada. Shipments imported for the purpose of selling must conform with the minimum standards of purity and germination for seed of the kind.

Collectors of Customs are instructed to sample all incoming seed shipments and forward the samples to the office of the seed inspector for the district. Seed lots for which a control sample certificate is held by the consignor and on which he has marked grade name and control sample certificate number are released to the consignee upon sampling. Other shipments must be held for test but delivery may be taken under bond pending result of the examination. If the seed does not

conform to the required standard; the consignee may elect to undertake recleaning under bond, but not until satisfactorily recleaned as shown by a retest of the recleaned seed can full release and cancellation of the bond be obtained.

FEED AND FERTILIZER CONTROL

Feed Control—An amendment to *The Feeding Stuffs Act*, effective from October 1, 1923, prohibits the adulteration of wheat mill feeds with screenings, scourings or other foreign materials. Bran must now be pure bran, shorts, pure shorts, and so forth, and the screenings cleaned from the grain before milling must be sold separately as "mill screenings". The law standardizes flour-mill by-products both as to name and chemical composition. As a result of this standardization, feeders may expect much greater uniformity in the quality of similarly-named wheat by-products placed on the market.

Fertilizer Control—During the first year of operation *The Fertilizer Act, 1922*, a reduction has been made in the number of brand names under which fertilizers are sold in Canada from 2,892 to 380. This registration year, it is expected that the number of brands will be reduced further to conform with the new regulations which came into effect last August. This is important to fertilizer users, as it has meant that hundreds of brands of fertilizers that were next to useless in point of plant food content or were sold under misleading names, have been legislated out of the market.

REGULATIONS FOR DAIRY PRODUCTS

UNDER authority of *The Act to Amend the Dairy Industry Act, 1914*, a number of new regulations have been authorized to which the attention of dairymen is directed. The more important provisions are (1) That on and after May 1, 1924, every package containing cheese, creamery butter or whey butter shall bear a registered number showing the factory where it was made, except prints of butter put up under the brand or trade mark of a wholesale or retail dealer; (2) That before January 1, 1924, every person engaged in the manufacture of cheese, creamery butter or whey butter, shall apply to the Dairy and Cold Storage Commissioner at Ottawa for registration, and the registered number given by the Dairy Commissioner shall be used in marking with a stencil the packages of cheese, creamery butter, or whey butter.

The text of the regulations follows:—

1. (*m*) "Whey Cream" means cream which has been separated from whey.

20. Every manufacturer of whey butter who purchases whey cream shall keep a special book in which shall be entered a record of all whey cream received, which record shall show the date each shipment was received, the person from whom each shipment was received, the number of pounds of whey cream, the percentage of fat and the number of pounds of fat in each shipment and the total pounds of fat received and the number of pounds of whey butter made each day.

21. Every person who manufactures or who sells whey butter wholesale shall keep a special book in which shall be entered the date of sale, purchase and shipment of whey

butter, the quantity so sold, purchased or shipped, the name and address of the person from whom it has been purchased and to whom it has been sold or shipped, and the name of the railway or steamship company or other transportation agency, by which such whey butter is transported.

22. Books and records required by the two preceding regulations shall contain no entries other than those required by the two preceding regulations and shall at all times be open for inspection by any inspector appointed under the authority of the Act.

23. (*a*) The Dairy and Cold Storage Commissioner shall keep a book to be called the Cheese Factories and Creameries Register, and every person, firm, corporation or association engaged in the manufacture of cheese, creamery butter, or whey butter shall, before January 1, 1924, apply to the Dairy and Cold Storage Commissioner, at Ottawa, Ont., for the registration of the cheese factory, creamery or combined cheese factory and creamery owned or represented by him.

(*b*) In case any person, firm, corporation or association establishes a factory or commences for the first time the manufacture of cheese, creamery butter or whey butter after the 1st January, 1924, such person, firm, corporation or association shall apply to the Dairy and Cold Storage Commissioner for registration in the manner above set forth before engaging in such manufacture.

24. Application for registration shall be in the form set forth in Schedule No. 1.

25. On receipt of particulars as set forth in Schedule No. 1, the Dairy and Cold Storage Commissioner shall send to the owner or representative of such cheese factory, creamery, or combined cheese factory and creamery, a certificate showing the registration number allotted.

26. On and after May 1, 1924, all packages containing cheese, creamery butter or whey butter, shall bear the registered number of the factory in which the cheese, creamery butter or whey butter was manufactured except in the case of prints of butter put up under the brand or trademark of a wholesale or retail dealer.

27. Any stencil, rubber stamp, or other device used to apply the registered number to packages containing cheese, creamery butter or whey butter, shall be in the exact form and size as set forth in Schedule No. 2 and with letters as described in Section 2 of these regulations.

28. No person shall erase or obliterate in any manner any registered number on any package containing cheese, creamery butter or whey butter.

29. Any person who violates any of the provisions of any regulations made under the authority of the Act shall for each offence, on summary conviction, be liable to a fine of not less than ten dollars, nor more than fifty dollars, together with the costs of prosecution.

30. Any pecuniary penalty imposed under these Regulations shall, when recovered, be payable and appropriated in the manner provided by Section 21 of the Act.

A NEW PUBLICATION

"Seed, Feed and Fertilizer Markets" is the title of a new periodical issued every two weeks by the Department of Agriculture at Ottawa. This leaflet emanates from the Seed Branch, which is responsible for the administration of the Acts regulating the trade in seed, feed and fertilizers. Information is given on current wholesale and retail prices, exports and imports, the retail feed market, registered seed, and other matters. In a foreword Mr. Geo. H. Clark, the Dominion Seed Commissioner, outlines the purpose of the periodical as follows:—

"The service of periodical market reporting is authorized in respect of seeds, feeding stuffs and fertilizers, with a view to providing what would seem to be a desirable adjunct to the legal control of trade in these commodities. Ignorance is said to be the environment in which fraud flourishes. It is unfortunate that in Canada, as in most other countries, a substantial percentage of retail merchants and farmers have not as fully as could be desired associated prices with relative quality, and in consequence the tendency has been, to far too great an extent, to manufacture, distribute and use commodities of such inferior quality that their employment is wasteful.

"It is hoped that by providing this market reporting service on as sound a basis as possible it will ultimately serve to beget confidence on the part of the interested public that will lead them to purchase and use materials on a sound economic basis.

"In the preparation of these reports extensive work has been done over the past six months with a view, so far as possible, to eliminating the danger of presenting misleading information. The work is in direct charge of officers who have had good experience in trading as well as in the study of foreign and domestic markets and market reporting of these particular commodities."

THE LOBO APPLE

THE Silver Wilder Medal has been awarded by the American Pomological Society to the Dominion Experimental Farms for the Lobo apple, one of the many varieties of McIntosh Red parentage originated by the Horticultural Division. This medal, which is the sixth of its kind received by the Division, is given only for new fruit originations of outstanding merit.

The Lobo is an apple very similar to the McIntosh in outward appearance, flesh and flavour, but is ready for use about a month earlier, thus lengthening the season of apples of McIntosh type.

The Lobo apple is an open pollinated seedling of the McIntosh. Seed of the McIntosh was saved in the Horticultural Division of the Central Experimental Farm, Ottawa, in 1898, and was sown there in the fall of that year. The seed germinated the following spring and the young trees were set out in fruiting rows in the spring of 1901. One of these trees, afterwards called Lobo, fruited in 1906, and as it continued to be very promising after each year of fruiting, it was named Lobo in 1909.

It was propagated and sent out for further testing, and proved so promising in widely separated parts of

Eastern America that it was submitted to the Committee on Wilder Medals as a variety to precede McIntosh in season.

Following is a description of this fruit as grown at Ottawa:—

LOBO (McIntosh seedling): Above medium size; roundish conical; cavity medium depth, open, sometimes russeted; stem short to medium, stout; basin deep, narrow, almost smooth; calyx open; pale yellow, almost white, washed with bright crimson; predominant colour bright crimson; seeds medium; dots moderately numerous, grey, indistinct; bloom little, if any; skin thick, tough; flesh white with traces of red, fine grained, tender, juicy; core medium; subacid, sprightly, pleasant, good flavour; quality good; season October.

EGG-LAYING CONTESTS

The Fifth Canadian Contest

THE Fifth Canadian Egg Laying Contest commenced on November 1, 1923, at the Central Experimental Farm, Ottawa.

Little difficulty was experienced in the handling of the outgoing and incoming birds. Previous methods were adopted and, in spite of the fact that only one day intervened this year between the old and new contests, all was in readiness on the arrival of the birds.

Taken as a whole, the new contest is made up of excellent material, and in some cases the birds are considerably in advance of any previously received at Ottawa.

The Contest is again enlarged and ten additional pens now brings the total to eighty.

A widely spread area is covered by the entries, which are as follows: Ontario 59 pens, United States 6 pens, Alberta 4 pens, Quebec 3 pens, New Brunswick 2 pens, Nova Scotia 2 pens, Manitoba 2 pens and British Columbia 2 pens.

The eighty pens are made up of the following breeds: White Leghorns 42, Barred Rocks 30, White Wyandottes 4, and one pen each of Rose Comb Rhode Island Reds, White Rocks, Single Comb Anconas, and Single Comb Rhode Island Reds.

The Fourth Ontario Contest

The Fourth Ontario Egg Laying Contest commenced on Thursday, November 1, 1923. The contest, which is also conducted at the Central Experimental Farm, Ottawa, is restricted to the residents of the Province of Ontario, and this year it was again necessary to increase the accommodation. Forty pens are now provided and are made up as follows:—

White Leghorns 22 pens, Barred Rocks 13 pens, Single Comb Anconas 2 pens, and one pen each of White Rocks, White Wyandottes and Single Comb Rhode Island Reds.

The new birds are quite up to the standard of past years, and have every appearance of being likely to give a good account of themselves, so that interesting work may be expected during the coming year.

DISTRIBUTION OF VEGETABLE SEEDS

IN his annual report, the Dominion Horticulturist, Mr. W. T. Macoun, records that during the early part of last winter, 995 applications were received for seed of the varieties of vegetables under improvement in the Division of Horticulture of the Experimental Farms Branch. The applicants were sent samples for testing so far as the supply of seed would permit. While a large percentage of recipients of packages of seed reported their findings carefully, a smaller number made their reports too vague to be useful, and a large number failed to report at all. The clear reports received numbered 233, and the vague reports 179, while those who failed to make returns totalled 458. In addition to the general distribution in Canada, a reciprocal exchange of varieties was arranged by the Division with England, Russia, China, and Central America.

PART II

Provincial Departments of Agriculture

THE HORTICULTURAL SERVICE OF THE QUEBEC DEPARTMENT OF AGRICULTURE

By J. H. LAVOIE, Director

Historical Notes

NOTWITHSTANDING that the cultivation of domestic fruits of European origin had been introduced into this country at the time of the arrival of Louis Hébert at Quebec in 1617[1], it was only from the year 1892 that the Provincial Governments of Quebec seriously undertook to work for its extension. Up to that time, the degree of development that it had attained was due to private initiative and to the scattered efforts of a few horticultural societies[2]. The first marked government impulse was given to fruit culture by the Hon. L. Beaubien, Provincial Commissioner of Agriculture, in 1893, for whom the way had already been prepared by such illustrious forerunners as Provencher, Morissette, Dupuis, Guilbault, Chapais, Mignot, Gill, Archibald, Rhodes, Fisk, Shepherd, Brodie, etc. It manifested itself by the establishment of small model orchards[3], and by the opening of a practical school of arboriculture at the establishment of the Trappists, at Oka[4], which considerably increased the area of fruit plantations, especially in the district of Montreal. To this phase of development succeeded that of the improvements brought to the cultivation of fruit by the Pomological Society, founded in 1893, to watch over the destinies of the young Quebec Pomona. It was at its instigation that the Ministers of Agriculture established, in 1898, the first six fruit stations, and in 1911, the first four demonstration orchards, and upon that occasion, appointed, for the first time, officers whose special duty was to occupy themselves with inspection and demonstration work.

It remained to the Honourable Mr. Caron, the present Minister of Agriculture, to complete the work commenced and prosecuted under such happy auspices, by establishing, in 1914, an administrative service, whose sphere of activity was to extend throughout the Province, whose functions were to give advice on questions referred to it by the ministerial authorities, and whose mission was to secure information from the most authoritative sources, to popularize it, to group the scattered elements of progress so as to assure their utility, and thus to work efficiently and incessantly for the advancement of fruit, vegetable, flower, tobacco, and potato cultures and industries.

Organization and Functions

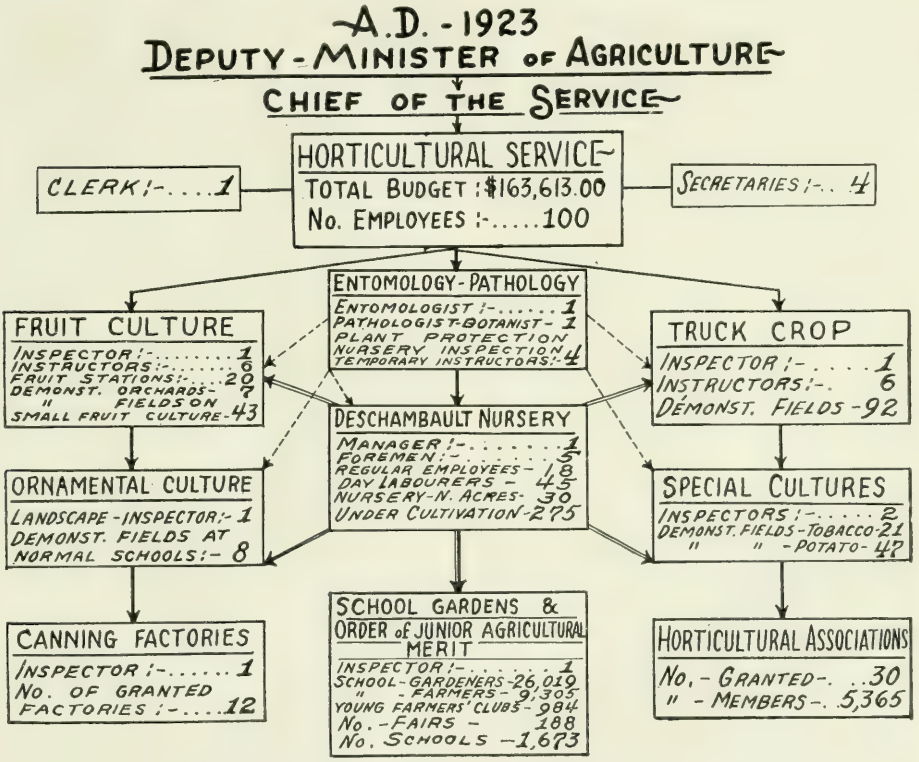
This service known as the Horticultural Service includes at present nine sections namely: (1) Fruit culture; (2) Truck crops; (3) Ornamental culture; (4) Special cultures; (5) Entomology-Pathology; (6) the Deschambault Nursery; (7) Food canning; (8) School gardens and the Junior Order of Agricultural Merit; (9) Horticultural Associations.

It is composed of thirty-one officers, including one head, one ento-

mologist, one botanist-pathologist, one nursery manager, eight inspectors, thirteen instructors, one clerk and four secretaries.

The organization of the Service, from the point of view of the connection and of the extension of the sections, of the distribution of the personnel and of the budget, may be represented by the following sketch:—

Upon the head of the Branch devolves the daily task of following the producing the various crops in each district; to advise the ministerial authorities of the present and prospective conditions that may influence the chief factors of production and sale; to report to them upon the manner in which horticulture is administered and directed, and to suggest to them such modifications as are necessary to obtain the best results; to organize the different sections of the Branch in such a manner as will enable each



interior and exterior development of horticulture in the way of experiments, discoveries or improvements, as well as in the administrative organization; to keep himself constantly in touch with the conditions of supply and demand, as well as of those of transportation; to obtain the fullest information upon the cultural possibilities of the different districts of the Province and upon the cost of of them to attain its maximum of efficiency; to direct, to co-ordinate and control the activities of the members of the staff; to arouse their spirit of initiative and to encourage their efforts.

To the entomologist and the botanist-pathologist are assigned functions analogous to the preceding, since their duties oblige them to be in constant relationship with the developments

occurring in each of their respective domains, both within and without the Province, and which, therefore, the organization of their section imposes upon them. They are required to test new experiments which may have succeeded elsewhere; to popularize the knowledge and to demonstrate the efficacy of the best preventive and curative methods for the protection of plants against disease and destructive insects; to direct the work of their subordinates, and to conduct laboratory work; to make an annual inspection of nurseries and to give them the certificates provided for by law; to identify specimens that may be sent to them; to mount botanical and entomological specimens, etc., for the teaching of natural history in the primary schools.

To the inspectors of small-fruit, flower, tobacco, and potato growing are confided the oversight and the responsibility of the fruit stations, the demonstration fields and orchards, which they are required to visit at least once a fortnight, from February to December. At these inspection visits, of which they give notice in advance, they give, at the home of each of the managers, demonstrations for the benefit of the producers of the locality. Between times, they have to verify the account books kept by each of the managers and to transmit to us the financial statements with their reports at the end of the year; to prepare lists of the material required at each of these establishments for the following year; to notify us at once of any of the managers who do not give satisfaction, and to keep us informed upon the efficacy of the methods and material employed, upon the particular conditions of production and sale in their respective districts, and upon the modifications and improvements which they believe it to be opportune to introduce in administration; to give, during the winter, in the neighbourhood of towns and industrial centres, series of short courses, illustrated by lantern views, upon different horticultural subjects.

Upon the inspector of school gardens devolves the duty of packing and shipping some 300,000 packets of seeds and seed grain sent, each spring, from the Deschambault nursery, as well as the sending of the prizes in kind, won, during the previous year, by the best farm pupil of each of the districts having an official agriculturist; to see to the distribution of directions for cultivation; to assist the official agriculturists in the inspection of household gardens, and in the organization of school exhibitions; to visit the plots cultivated by the competitors in the Junior Order of Agricultural Merit; to adjudge the prizes; to superintend and to assure the efficacy of the results produced by these gardens at the localities where they are established.

To the inspector of canned foods is confined the care of initiating new instructors in the manufacturing of domestic canned foods and to supervise their work; to furnish upon request to those who wish to establish factories for canned foods necessary information and full directions as to the possibilities of success; the nature and the capacity of the necessary apparatus, also as to the plans of construction and management of the factory, as to the total cost of the enterprise and the possible cost of running the factory; to visit annually the factories in operation which receive grants from the Department with a view of contributing to the improvement of the quality of the products.

The instructors are to give demonstrations at the homes and also public demonstrations on cultivation of various kinds and industries connected with cultivation; to collect annual statistics of the different horticultural productions; to pay individual visits to the members of

the horticultural societies at least twice a year; to aid in the organization and the holding of standing crop competitions and of horticultural exhibitions; to assist official agriculturists in everything relating to school gardens.

The aim and the development of our activities bear principally on the expansion of the cultivation of fruits, vegetables, flowers, tobacco, and potatoes for the purposes of domestic, commercial and industrial utilization; on the concentration of these different productions at localities most favourable to their commercial and industrial extension; on as complete a supply as possible of our centres of consumption by local production; on the education of the producer as to the choice of the most desirable species and varieties, and as to methods of cultivation, of selection, of classification and of packing, best calculated to satisfy different requirements and to diminish the net cost; on the propagation of species and varieties; on the organization of the sale of the products; on the industrialization of horticultural products; on the education of the consumer relative to the disposal of our productions and to the varieties in which it is in his interest to ask for; lastly, upon the improvement of food supply in the country districts by domestic canning, and by the embellishment of homes through the cultivation of ornamental plants and flowers.

The means of popularizing to which we have recourse for the realization of this programme may be summarized as follows: propaganda by lectures, publications and house to house visiting by our inspectors; demonstrations of every kind and principally by the establishment of fruit stations destined to determine cultural possibilities, demonstration fields and orchards destined to show the efficacy of recommended methods and the profits realizable from each of these cultures; the granting of generous subsidies: (*a*) to horticultural associations for the holding of competitions or exhibitions; (*b*) to the manufacturers of canned foods for the improvement of their products; (*c*) to individual producers by the purchase of costly machines of great capacity, such as power sprayers, dusters and sorters; the organization of school gardens and of Junior Order of Agricultural Merit competitions, destined to form a progressive agricultural spirit among our rural youth, by furnishing at an early age the opportunity of becoming familiar with the best methods of elementary culture, and in stimulating its emulation by attractive prizes; the multiplication and sale at moderate prices of fruit-trees and shrubs, of hardy and true-to-name varieties, to the members of the different agricultural associations of the Province.

Some Results

Fruit stations have not only shown cultural possibilities, but, above all, they have contributed to render the production of fruit more general.

The demonstration orchards have proved that the net profits from orchards about twenty years old, may vary from $210 to $600 per acre.

The demonstration fields have proved, first, that 1,720 pounds of tobacco per acre may be obtained in localities where only 1,300 pounds were produced hitherto;

Second, that the potato crop may be increased from 200 bushels to 550 bushels per acre;

Third, that the culture of small fruits has produced net profits of $226 to $720 per acre;

Fourth, that truck crops have produced net profits of $135 to $560 per acre.

One of the rural canning factories which we aided in establishing last

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spring has realized this autumn a net profit of $1,750 for two car loads of manufactured produce.

During the last five years, we have directly contributed to the plantation of 250,000 fruit trees and of 3,000,000 fruit shrubs and small fruit plants.

In the course of the last fiscal year we have contributed financially 25 per cent of the cost of purchase of 27 power sprayers.

Finally, we have been able to ascertain that those who are now deserting the soil of the Province of Quebec are not the fruit and truck crop growers, and for good reasons.

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(1) " Sieur Hébert planted some apple trees during his lifetime, which have borne some very good fruit, as I have been assured, but the cattle spoiled these trees ".

(*Relations of the Jesuits*. Letter of P. LeJeune, at Quebec, in 1636, volume 1 x page 154).

(2) " Horticultural Societies of Montreal.

" Horticultural Societies of Quebec.

" Horticultural Societies of Missisquoi.

" Horticultural Societies of Rouville.

" Horticultural Societies of Shefford.

" Horticultural Societies of Brôme.

" Horticultural Societies of L'Islet.

(3) " Here is a considerable industry (that of the apple.) I propose to strongly favorise it. Next spring, I shall entrust to all the members of Parliament a certain quantity of fruit trees and I beg of them to make model orchards of these trees for the counties."

(4) " To favorise and spread it, I established an arboricultural school at the Monastery of the RR. FF. Trappists, at Oka, where the fruit and forest tree cultures, the pruning and grafting, the confection of wine and fruit preserve will be taught gratuitously."

(L. c. Honourable Beaubien, March 11, 1893).

(5) " The wild apple-trees, and those that are raised from seeds bear very fine apples. The peach trees produce abundantly, but like the vine—that is, the fruit is all on the ground, because the tree has to be covered with straw or other protection until the month of April, lest it freeze. The pear-trees are more delicate; I saw one that blossomed twice last year—once in the spring, and once in the course of the summer. This year we saw an apple-tree loaded with large apples in June, which had one branch all in blossom. The cherry-trees bear hardly any fruit; they do nothing but blossom and shoot out branches and roots—in such numbers that a forest of trees grows up at their feet, but the people do not know how to keep them down. There are black plums resembling black damsons, which remain on the trees during the winter and are excellent eating in the Spring.

" There are quinces that are fairly good, but the tree grows like the peach-tree and has to be covered during winter."

(Letter of F. Chauchetière to his brother, Ville-Marie, August 7, 1694. Jesuits' Relations. Volume LXIV. Pages 133 and 137.

THE PROGRESS AND TREND OF AGRICULTURE IN BRITISH COLUMBIA

By WM. J. BONAVIA, Secretary, Department of Agriculture

THE steady progress of the agricultural industry in the Province of British Columbia can be well shown in its broader outlines by a comparison of the records of acreage under crop, the production over a series of years, and an analysis of the imported agricultural products.

Official agricultural statistics are available from the year 1910, and for the purposes of illustration the years 1910 and 1920, a decade apart, and the present year (1923) will be dealt with so far as possible, the fluctuations of the war years being thus eliminated.

FIELD CROPS

COMPARISON OF CROP AREAS AND YIELD YEARS, 1910, 1920 and 1923

	Year 1910		Year 1920		Year 1923	
	Area	Yield	Area	Yield	Area	Yield
	acres	bush.	acres	bush.	acres	bush.
Fall wheat	4,369	206,070	13,762	264,918	13,500	378,000
Spring wheat	5,133		32,453	608,493	31,400	816,000
Oats	33,209	1,701,533	47,992	1,667,722	59,200	2,990,000
Barley	1,853	51,509	9,646	364,136	7,000	242,000
Spring rye	370	5,658	5,367	138,200	7,600	177,000
Peas	1,572	43,979	2,657	69,082	2,300	57,000
Beans	347	5,346	1,615	32,300	1,100	22,000
Mixed grains	526	12,802	4,893	176,148	5,300	204,000
		tons		tons		tons
Potatoes	10,872	48,936	17,780	88,011	19,400	115,100
Roots	2,312	25,395	7,403	80,470	7,200	73,450
Hay and Clover	133,317	208,499	127,017	254,034	148,000	333,000
Fodder corn	355	3,940	4,713	54,199	4,600	50,000
Alfalfa	3,741	11,223	13,478	40,434	16,500	58,000
	197,976	2,324,890	288,776	3,838,147	323,100	5,515,550

It will be seen from the above table that in practically every case the increase in area under field crops has been substantial, not only during the ten-year period, but subsequently also. Notable increases are recorded in the acreage under oats, mixed grains, hay and clover, fodder corn and alfalfa. Peas and beans show a decrease since 1910. The total increase between 1910 and 1923 for acreage under field crops is 63 per cent.

Whilst making due allowance for seasonable variations, there is evidence also, owing no doubt to better methods of cultivation, proper rotation and seed selection, that the yields per acre are well maintained in the majority of field crops. The following figures amongst others are of interest in this connection:

Crop	Average to 1920	Year 1923
	bush.	bush.
All wheat	23·25	26·50
Oats	48·50	50·50
Beans	18·50	20·00
Mixed grains	36·0	38·50
	tons	tons
Potatoes	5·4	6·2
Alfalfa	2·95	3·50

The figures relating to the importation into British Columbia of agricultural products from other provinces in Canada, as well as from foreign countries, also bear out the progress made by this province in becoming more self-supporting, as will be seen from the attached table:—

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	Year 1910	Year 1920*	Year 1922
(a) Agricultural products imported into British Columbia from other [illegible] in Canada, showing percentage for the year	$12,833,593 or 43·6 p.c.	$18,902,981 or 19·8 p.c.	$12,970,001 or 18·0 p.c.
(b) Agricultural products imported into British Columbia from [illegible], showing percentage for the year	2,353,632 or 7·8 p.c.	7,913,488 or 8·2 p.c.	4,173,321 or 5·7 p.c.
(c) Home production, showing percentage for the year	14,398,990 or 48·6 p.c.	68,926,090 or 72 p.c.	55,322,971 or 76·3 p.c.

*The year 1920 was one of high post-war values.

NUMBER OF FARMS AND ACREAGE

The Dominion Census figures show that the number of occupied farms of one acre and over in this province has increased from 16,958 in 1911 to 21,973 in 1921, whilst the total farm acreage was increased during the same period 12·6 per cent.

The average size of farms is still decreasing, although not to the extent generally credited; in 1911 the average size of a holding was 149·8 acres and in 1921 130·2 acres. There has also been an increase during the period amongst farms from 11 to 50 acres in extent with a considerable decrease in those under 5 acres.

DAIRYING

The dairy industry in British Columbia, while still of no great magnitude, can show a remarkably steady development for the past twelve years.

There exist now within the Province thirty manufacturing creameries, three cheese factories, three condenseries, and several plants devoted solely to the manufacture of ice cream. Several of the creameries are still doing only a small business, having been recently established, with Departmental assistance, in the newer portions of the country, but without exception they show signs of coming prosperity with the speedy reduction of manufacturing costs under an increased make.

There is in Canada no country better adapted for dairying than the agricultural portions of British Columbia. In districts varying in altitude and precipitation, corn, roots, alfalfa, red clover, and various silo mixtures yield tonnages not obtained elsewhere.

The four main breeds of dairy cattle are represented: Holsteins, principally on the Lower Mainland, Jerseys and Guernseys on the Lower Mainland and on Vancouver Island, with Ayrshires here and there throughout the Province, to the interior parts of which this breed is specially adapted.

Cow-testing associations and cow-testing centres have been for several years in operation, mainly with grade herds, and good progress has been made. The average of all completed lactation periods recorded during 1922 showed a yield of 7,073 pounds milk and 316 pounds butterfat.

Prices for dairy products are uniformly higher than in more eastern provinces owing to British Columbia being still an importing province. Several million pounds of butter and considerable cheese come in annually from without. Production is, however, steadily increasing, but good markets within are assured for years.

The total dairy production for 1910 was valued at $3,645,405; for 1922 at $8,001,135.

Splendid opportunities exist for intending dairy farmers to locate on the newer lands of the Province in Central British Columbia, especially in the settlement areas administered by the Land Settlement Board.

LIVE STOCK

In examining the records for live stock over a series of years, the outstanding features are the steady increases in dairy cattle and poultry. The following figures are of interest:

1911—Dairy Cattle 33,953
1920—Dairy Cattle 94,816
1923—Dairy Cattle 117,143

In horses and beef cattle there have been fluctuations; the total number of horses increasing from 57,415 in 1911 to 65,000 in 1916, then declining through a series of years; horses are, however, again on the upgrade, a total of 54,017 being recorded for the present year.

Beef cattle also reached their peak in 1916 with a total of 170,000; poor markets of the past few years, however, have reduced the total to 147,001 for the present year, the lowest since the year 1918.

Sheep and swine figures have been fairly consistent, the sheep showing a small but steady increase, but swine at present are at a low figure in accord with recent market tendencies, as follows:

——	Sheep	Swine
1911	39,272	33,604
1920	46,473	44,010
1923	53,336	42,845

CATTLE

Exceptionally favourable crop and pasture conditions caused a more hopeful feeling in the live stock industry during the past year. Throughout British Columbia there was an excellent rainfall during the growing season, which resulted in an unusually heavy hay crop, and this will enable the live stock men to better cope with market conditions. Some beef cattle were shipped out of the range districts unusually early, and shipping continued during the remainder of the season. All cattle were in splendid shape in the fall. During a season of poor pasture on the range, cattle must be held to get all the flesh on them that is possible, and a short supply of winter feed causes a glut on the market in the fall. Fall calving dairy cows were selling at an advance of 15 to 20 per cent over last year, with a somewhat keener demand for all classes of dairy stock.

SHEEP

The sheep industry is in a very healthy condition. Mutton is a good price and lambs have brought considerably better prices than a year ago, which is satisfactory to the producers. The wool market is strong and as high as 20 cents per pound is being paid by local buyers. Shippers to the Canadian Co-operative Wool Growers' Association expect to secure a better price than that quoted.

HOGS

The hog market has shown a downward tendency, but even at present prices hogs can be produced at a profit. There has been a keen demand for weanling pigs.

HORSES

Aside from a good demand for big drafters, the horse market is very quiet. Breeding operations are being restricted this year because it is felt that unless a farmer has large drafty mares he cannot afford to raise colts.

GOATS

While goats have suffered in common with cattle from the all-round depression in prices, they have held their own remarkably well. Easier prices during the past season have meant the better distribution of goats, the keeping of which is steadily on the increase, and the number in the province to-day is probably over nine thousand. The policy of assist-

ing in the importation of high-class milk stock, and especially of pure-bred bucks, has resulted in a gradual lowering of the quality of the goats in the province, and it is probable that in the near future a system of certifying milk yields will be put in force as well as the licensing for public service only of pure-bred bucks of approved milk ancestry and of good conformation. This will tend to maintain the quality of the stock at a high level and will also tend to better prices.

POULTRY

The poultry industry has after a series of strenuous years shown a big annual increase since 1918 as follows:

Year	Total Poultry
1918	1,001,806
1920	1,340,082
1923	2,165,516

The forward movement in production and egg marketing during 1922-1923 is outstanding.

This year weather conditions during the hatching season were far from favourable, but despite this the young stock grew remarkably well and, in many cases, through being hatched too soon, birds were laying before the period of high prices; such fowls in almost every instance go into moult at the beginning of winter.

Owing to the poor demand for hatching eggs in the spring prices obtained were the lowest since the spring of 1915. Co-operative associations and independent shippers took advantage of the low prices to export nearly three-quarter of a million dozen eggs out of the province. Included among these was a car-load of eggs sent to Glasgow, Scotland.

Up to the end of the poultry year, which is October 31, the wholesale average price for eggs was 28½ cents for the year, being possibly the lowest price received for the past fifteen years.

Quite a few poultry breeders went out of business and many others reduced their breeding flocks to the minimum. This forced a large quantity of dressed poultry on to the markets and, as a consequence, lowered the price somewhat.

Fewer ducks and geese were raised last year, but for turkeys the season proved almost as good as the last. Prices are likely to be lower this year, however, as cold storage stocks show a large increase over the same period last year.

With the bumper wheat crops in practically all parts of the Dominion, poultry breeders are facing the new year with slightly better prospects than recently, especially as the egg grading regulations have been put into force. These regulations have been the means of checking a certain amount of American importation, and have guaranteed better prices for the heavier and higher grades of eggs.

FRUIT GROWING

The early records of fruit growing in British Columbia are limited. It is on record that Sir James Douglas, Governor of the Colony in 1851, planted many apple trees in the vicinity of Victoria, and ten years later he is mentioned among the exhibitors at the first agricultural exhibition held in the province. Apples were also on view at the first agricultural exhibition held at New Westminster in 1867.

The date of the beginning of fruit growing in the interior valleys is harder to determine. Plantings apparently were made as far back as 1864 at Penticton; commercial plantings, however, were probably not made much before the early eighties, when large orchards were set out at both Kelowna and Vernon.

Since that time the industry has advanced rapidly and the following figures will give some idea of the increase:

Year	Number of Trees
1891, Estimated	450,000
1901, Census	649,091
1911 "	2,677,486
1921 "	2,694,538

There is very little difference shown by the figures given in the 1911 census and the 1921 census. It is well known, however, that large acreages were planted between 1911 and 1914, in locations unsuited to tree fruits, the result being that many acres did not make satisfactory growth and never reached the bearing stage, thus accounting for the fact that the 1921 figures do not show a marked increase. There is no doubt, however, that future plantings will be in areas suited to fruit production and that such plantings, while not as heavy as those of the past, will be more safe and sane.

As regards the production of fruit, figures do not show a very large increase until after 1915.

The attached table relates to *boxed fruit production* only:

Year	Quantity	Value	Increase during period
	boxes	$	boxes
1890	122,120	.....	.....
1900	343,533	436,000	221,413
1910	789,739	1,000,335	446,206
1915	953,700	1,352,387	163,961
1920	2,243,724	4,668,486	1,290,024
1922	4,173,376	3,764,730	1,929,652

Increased acreage and production are also to be found in the small fruits. According to the Dominion Census of 1911, there were 1,336 acres devoted to the growing of small fruits. This acreage as shown in the Census of 1921 was 6,319, an increase of 375 per cent.

Regarding the value of the fruit and vegetable crop, official records show a total of $1,939,110 for the year 1910 and $4,915,604 for 1922; the latter figure was, however, 24 per cent less than the record for 1921 due to low values.

CO-OPERATION

No account of the progress of Agriculture in British Columbia would be complete without reference to co-operative work, and in particular to co-operative fruit marketing. There have been periods of enthusiasm for co-operation as far back as the "nineties," when numerous organizations were formed, of which only one is in existence at present (the Vancouver Island Flockmasters' Association). The large majority of the present associations date from the year 1913, being formed under the provisions of *The Agricultural Associations Act* of 1911 and amendments, subsequently merged into *The Co-operative Association Act* of 1920.

The following figures are revised to date:

(*a*) Fruit Growers, Fruit Shippers and Miscellaneous Co-operative Associations handling horticultural products	70
(*b*) Co-operative Associations operating stores in rural communities	81
(*c*) Live Stock Associations	32
(*d*) Creameries	13
(*e*) Farmers' Institutes	143

With regard to (a) the horticultural industry, it is noteworthy that no less than twenty organizations have been incorporated this year due to the fillip given to co-operation by the visit of Aaron Sapiro to the Province in the early part of the year in the interests of co-operative fruit marketing; the majority of these new associations being linked up with the Associated Growers of British Columbia with headquarters at Vernon.

Most of the fruit sold in the province is now marketed through co-operative channels. In the small fruit districts it is safe to say that 75 per cent of the fruit at least is marketed co-operatively, while in the tree fruit districts probably 85 per cent reaches the market through co-operative channels. Co-operative marketing has always been an important factor in the selling of British Columbia fruit and now that the production of tree fruits has increased in the last seven years by approximately 85 per cent, it has become more evident that this form of marketing is the only practicable system. The same may be said with regard to the marketing of small fruits. Not only do the growers of small fruits realize the advantages of co-operative marketing, but it has also been the means of convincing them that a more satisfactory handling of berries was essential. The result has been the establishment of pre-cooling plants in the chief small fruit centres. By this method of handling, the grower is enabled to put his fruit on the distant prairie markets in first class shape, and a wider market has been assured. In this country, as in every other, the co-operative system is subject to considerable criticism. The principle, however, remains sound, and it undoubtedly will always be the means through which the larger percentage of British Columbia fruit will be marketed.

(c) About twenty per cent of the Farmers' Institutes engage in business for their members, some of the figures supplied to the Department being of great interest, showing the wide range of commodities handled. The following items are taken at random from the year 1922:

Bella Coola F.I.	Feed, oil, fertilizer, etc.	$8,864 61
Surrey F.I.	Stumping Powder, fuse and caps	8,756 90
Kitsumkalum F.I.	Feed, Hay and Fertilizer	3,253 00
Squamish F.I.	Building materials for a hall	768 72
Arrow Lakes F.I.	Fruit boxes	669 80

The Crawford Bay Farmers' Institute, which runs a general co-operative store for its members, made sales amounting to $14,292.53.

In reviewing the whole agricultural situation it may be safely said that the era of specialization along any single line is recognized as having been a mistake and that the trend of agriculture in British Columbia will be along mixed farming lines, with an immense development of the dairy industry in the near future.

DAIRYING IN SASKATCHEWAN

By PERCY E. REED, Dairy Commissioner

SASKATCHEWAN, the largest of the three prairie provinces, is located in the centre of the Canadian prairies. The province extends from the international boundary on the south to the sixtieth parallel on the north, a distance of 760 miles. It is bounded by the provinces of Manitoba on the east, and Alberta on the west, and is 393 miles wide at the southern boundary and 277 miles at the 60th parallel.

The land area of Saskatchewan is 155,764,480 acres and the water surface 5,323,520 acres. Of the above land area approximately 93,000,000 acres are arable.

The province has a population of 760,000, of which more than 72 per cent are resident on the land. The last federal census, 1921, reports the province as having 126,436 occupied farms, though only about one-third of the land suitable for agricultural purposes is yet under cultivation.

A Grain Growing Province

By natural adaptability of both soil and climate Saskatchewan is peculiarly suited for grain production, and until quite recent years the agricultural activities of the people, outside the areas where stock raising was carried on, were almost exclusively confined to grain growing. Saskatchewan produces approximately 60 per cent of the total wheat of Canada, and in 1922 her production of this commodity was 250,167,000 bushels. Wheat is and will for years continue to be the chief crop of the Saskatchewan farmer, but other grains and also forage crops are grown to a high degree of perfection in practically all parts of the province. Conclusive evidence of the outstandingly high quality of Saskatchewan grains is found in the fact that out of a total of eleven sweepstake awards for the world's best wheat offered in convention with International Grain Shows and Soil Products Exposition held in United States, nine have been won by Saskatchewan growers. At one of the eleven shows, Saskatchewan was not represented. Six out of eleven similar world sweepstakes for oats have also been won by Saskatchewan grown exhibits.

Progress in Dairying

Dairying, though still an infant industry in Saskatchewan, has in recent years made very rapid progress. With miles of the most fertile open prairie waiting for the plough, where there were neither stones nor trees to interfere with cultivation, grain growing naturally came first and for years after the province received its autonomy—which was not until the autumn of 1905—there was not sufficient milk, butter or cheese produced to supply home requirements. Here, as elsewhere, however, a one-crop system of farming is hazardous, and with permanent settlement came the dairy cow and the dairy manufacturing plant to supplement grain growing.

During 1906, the first year for which provincial statistics are available, there were only three creameries in operation with a total output of 132,446 pounds. In 1918 the creamery output exceeded 5,000,000 pounds, and during the five year period, 1918 to 1922, the make increased more than 80 per cent, so that in 1922 over 9,000,000 pounds of creamery butter was produced.

Government Grading of Butter

In a province where nearly 75 per cent of the population are agricultural producers, it was evident that markets for the product must be found outside, and accordingly in our dairy development every attention has been given to meeting the requirements of the export market.

In 1913 a system of government grading of butter was instituted, and in 1914 the issuing of government certificates of quality was adopted. This service originally was intended to be chiefly educational, and was calculated not only to improve the quality of the output, but also to develop uniformity in the butter manufactured in all parts of the province. The commercial importance of the service and of the grade certificate, however, was soon evident and has been an important factor in developing the work, as the more discriminating markets have in recent years refused to accept carlot shipments unless covered by government certificate. To encourage the general grading of the creamery output, the provincial government has continued to furnish the butter grading service without charge, and in 1922, 90·7 per cent of the entire creamery output was scored by the official government graders. The butter grading service is administered by the

Dairy Branch of the Department of Agriculture, and the men in charge of the grading are not only experts in butter manufacturing but also keen students of market requirements. Through the operation of this service, Saskatchewan creameries are to-day delivering to the world's markets a standardized product of very uniform quality.

The importance of the export trade to the dairy industry of Saskatchewan is evidenced by the fact that during 1922 there were 224 car loads —56·6 per cent of the total creamery output—shipped out of the province under government grade certificate.

Cream Bought on Quality Basis

The quality of the butter necessarily depends to a great extent upon the quality of the cream from which it is manufactured. In view of this, the purchase of cream on a grade or quality basis has also been in practice since 1913. This grading, however, was carried on only by mutual agreement amongst the creamery operators until the present year.

For the season of 1923, the provincial government was requested by the dairy interests, both producers and manufacturers, to make the purchase of cream on a grade basis compulsory. Accordingly legal standards were fixed for five grades of cream and a staff of trained men appointed as official government graders and, attached to the staff of the Dairy Branch of the Department of Agriculture, were placed in the creameries of the province to grade the cream as received. These officials are also responsible for the checking of weights and of butterfat tests on cream received, and for seeing that correct settlement is made with the patron. This system must have the effect of greatly improving the average quality of the cream delivered as well as inspiring confidence in the minds of the dairy producers.

Co-operative Development

Co-operative endeavour has been a prominent feature in connection with Saskatchewan's dairy development. In the early years, owing to sparse settlement and small dairy herds, the province did not offer an inviting field for private investment in the creamery business. The establishment of creameries was, however, essential to exclusive dairy development, and the provincial government came to the aid of the dairymen by lending generous financial assistance to local associations of farmers in the establishment of creameries at suitable railway points where the manufacture of the product from a large territory could be centralized. This assistance was granted under special legislation passed in 1906. Sixteen associations organized and built creameries under this system. In 1917 these associations were, at the request of the shareholders, amalgamated by legislative enactment, so as to form a provincial organization known as the Saskatchewan Co-operative Creameries, Limited. This company has since made great progress in developing both the butter and produce business, and now owns and operates 28 creameries and seven public cold storages. During 1922 this farmer-owned co-operative company manufactured 42 per cent of the creamery butter output of the province, and also handled a large proportion of the eggs and poultry produced.

Private Creameries

While the co-operative movement has made remarkable progress in dairying lines in Saskatchewan, private enterprise has also done much toward the development of this branch of agriculture. There are now 36 privately-owned plants in the province, making a total of 64 creameries in operation, which during 1923

manufactured approximately 11,000,000 pounds of butter.

Possibilities Unlimited

Apart from supplying the requirements of the local milk and cream trade, dairying activities in Saskatchewan have been chiefly devoted to creamery butter. The ice cream business, though small, is developing rapidly, but to date little has been done in cheese, there being only four cheese factories in the province. During 1922 there were less than 30,000 farmers who were patrons of any dairy factory or milk plant. and on thousands of farms not even a family cow is kept. There are millions of acres of the most fertile and highly productive prairie lands still untouched by the plough. Less than one-third of the arable land of the province is settled. Yet the entire arable area is well suited for dairying, and all authorities agree that there should be a few good cows on practically every farm.

The above facts are evidence that only the fringe is being touched, and, as yet, Saskatchewan's dairying possibilities are practically undeveloped. But the industry has been established on a sound basis, with quality and uniformity in the finished product as the watchwords, and a fairer field for development of dairying work in either production or manufacturing would be difficult to find.

AGRICULTURAL REPRESENTATIVES IN SASKATCHEWAN

By F. H. AULD, Deputy Minister of Agriculture

SINCE Ontario undertook several years ago to place graduates of the Ontario Agricultural College in the Counties of Ontario to assist farmers in tackling special problems relating to agriculture, there has followed a general acceptance of the plan in some form or other in all of the provinces. The "County Agent" in the United States has become equally well known and equally popular, and the benefits accomplished through such agencies have established such service upon a sound basis.

In Saskatchewan a beginning was made in this work in 1914, when four graduates of the Manitoba Agricultural College were engaged to open up work at Shaunavon, Swift Current, Rosetown, and North Battleford. The situation was such, however, that the service was discontinued through the enlistment of two members and the utilization of the services of the others in other ways. In 1922, however, it was arranged to have five graduates take up work in the Local Improvement Districts in Southern Saskatchewan. P. H. Ferguson, B.S.A., was located at Maple Creek to work in Local Improvement Districts 112, 140, 170, and 227. J. A. Gray, B.S.A., was located at Robsart to cover Local Improvement Districts 20, 50, 80 and 81. D. G. Fidlar, B.S.A., worked Local Improvement Districts 21, 22, 52 and 82 from Robsart. L. M. Ogilvie, B.S.A., with headquarters at Cadillac worked 16, 17, 47 and 48, and Geo. F. Boyd, B.S.A., worked 13, 43, 14 and 15 from Limerick.

As a preliminary to more intensive work, a detailed survey was made of the occupied farms in these areas in order to establish the facts as to the class of soil encountered and the methods of farming which were being followed. A census of live stock was taken as well as data re acreage under cultivation and in crop. In addition, however, the Agricultural Representatives directed the grasshopper cam-

paign in their respective districts and endeavoured in a variety of ways to be of service. Following is a summary of their activities for the first year: promotion and supervision of co-operative experiments with corn, sweet clover, oats in rows, brome and rye grass; distribution of gopher poison in the Local Improvement Districts; investigation of crop pests including cutworms and grasshoppers and institution of control measures; weed investigation; inspection and scoring of seed plots for members of the Canadian Seed Growers' Association; judging standing crop competitions; promotion of co-operative live stock shipping; culling of poultry flocks; organizing live stock improvement associations and assisting in the introduction of brood sows of bacon type; investigations for the Debt Adjustment Bureau; and the holding of 98 extension meetings with a total attendance of 3,615 persons.

PLANT IMPROVEMENT IN ONTARIO

By DR. C. A. ZAVITZ

THE Government of the Province of Ontario furnishes information which shows that the average yearly increases in acre yields of barley, oats and winter wheat in the province for the last twenty-one years, in comparison with the years previous, amounted to a total of 249,730,411 bushels which, valued at average market prices, reached a total of $161,049,877.71. This amount is sufficient to pay the whole cost of maintenance of the Ontario Agricultural College during its entire history of nearly fifty years and also to continue the institution at its average cost of maintenance for an additional fifteen hundred years, or until the year 3423.

It should be noted that these increases in yields per acre have been made in spite of a natural tendency towards steadily decreasing acre yields in a comparatively new country where commercial fertilizers are seldom used with farm crops.

The Ontario Agricultural College has been the great factor in bringing about these increased acre yields of field crops of high quality on the individual farms. About 2,500 varieties of field crops obtained from different parts of the world have been grown under test and their yields and characteristics carefully studied for at least five years. From some of the varieties of greatest merit, improved strains and varieties have been obtained through careful selections from large nurseries planted by hand with thousands of selected seeds. As a last resort, controlled cross-fertilization has been used to originate new varieties superior to those obtained through selection from the varieties of highest record. For some time past, about 50,000 hybrid plants of farm crops have been grown and studied annually at the College. The plant improvement work has included several classes of cereal, forage, root, and tuber crops. In this short article, reference will be made only to barley, oats and winter wheat, the three principal small grain crops of the Province.

Barley

The average increase per acre of 17·44 per cent of the barley crop of Ontario for the years 1902 to 1922 inclusive, as compared with former years, was brought about largely by the distribution from the College to Ontario farmers of the Mandscheuri barley in 1892 and the O.A.C. No. 21

in 1906. In the experiments at the College, the common six-rowed variety of barley has been surpassed by the Mandscheuri, in a period of thirty-three years, by an average yield per acre per annum of 10 bushels and by the O.A.C. No. 21, in a period of seventeen years, by 11 bushels. The last named variety is a six-rowed, bearded barley with stiff straw and white grain of good quality. For some years past there has been scarcely a field of any other variety grown in Ontario.

Oats

The total increase of over one hundred and forty-five million bushels of oats in Ontario, resulting from increases in acre yields for the twenty-one years ending with 1922, as compared with the years from 1882 to 1902, was apparently due, to a considerable extent, to varieties introduced by the College. The Vick's American Banner oats were imported by the College in 1891 from James Vick's Sons, Rochester, New York. This name was later abbreviated to American Banner and still later to Banner. In the College tests, the Banner oats were surpassed by the Siberian, imported from Russia, by an average of 3·9 bushels per acre per annum from 1891 to 1902 and by the O.A.C. No. 72 by an average of 9·7 bushels per acre for the past sixteen years.

The O.A.C. No. 72 was started at Guelph from a single seed in 1903. It has a spreading head and white grain of good quality and, in comparison with the Banner, has about two per cent less hull, and requires exactly the same number of days to reach maturity. In the last seven years, of the 990 first prizes awarded to fields of standing oats in connection with the Field Crop Competitions throughout Ontario, the O.A.C. No. 72 received 521; the Banner, 220; and all other varieties combined, 249. In the competitions of threshed grain at four of the leading exhibitions of Ontario, the O.A.C. No. 72 received seventy-two and the Banner forty-one prizes in the last four years, the former surpassing the latter in awards from fifty to one hundred per cent at each of these exhibitions.

Winter Wheat

The Dawson's Golden Chaff variety of winter wheat was distributed from the College to Ontario farmers for the first time in 1893. It increased rapidly and for a long time has been the most extensively grown winter wheat in the Province. The O.A.C. No. 104 was originated at the College by crossing the Dawson's Golden Chaff and the Bulgarian. It is a heavy yielding white wheat with beardless head and white chaff. It was distributed throughout Ontario for the first time in 1916 and is now increasing rapidly in the majority of the counties of the Province.

Sources of Seed

The distribution of seed of these varieties from the College has necessarily been confined almost entirely to the farmers of Ontario. At present, however, they are all being grown by members of the Canadian Seed Growers' Association with headquarters at Ottawa.

PART III

Agricultural Education and Related Activities

AGRICULTURAL EDUCATION IN ONTARIO

By J. B. DANDENO, Inspector of Elementary Agricultural Classes

IT is intended to present here an outline of the history of agricultural education in Ontario, covering especially those activities which are carried on under the Department of Education. These activities are concerned only with schools below College grade and may then be divided into two classes,—(1) Public and Separate Schools; and (2) High Schools. Other features of agricultural education are under the supervision and care of the Department of Agriculture and include the work of the Agricultural College, the Kemptville Agricultural School and the School Fairs. The School Fairs concern only the Public and Separate Schools.

Agricultural education goes back farther than is usually supposed. On the establishment of the first Normal School in Ontario at Toronto, in 1847, provision was made for instruction in agriculture on the regular daily programme. The actual work which was covered in this agricultural course in the Normal School had to do mainly with agricultural chemistry. The body of the work undertaken can be inferred from the papers given at the close of the session in April, 1849. It is of sufficient interest, I think, to warrant my giving a copy of those examination papers. Two prizes, one of five pounds and one of three pounds, were given to those securing the highest and the second highest marks, respectively. In addition to these papers an oral examination was given to ascertain the relative knowledge of the candidates on practical agriculture.

In order to show the scope of the course given in the Normal School seventy-five years ago, a copy of the final examination paper is here given. It is quite certain, however, that little or no practical work was done in preparation for the examination. As the work carried on now in the High Schools of Ontario is intended to be educational rather than informational, the standard, as indicated by a written examination such as this, is apparently on a different plane. In fact the fundamental difference between the viewpoint of those having to do with the work as carried on then, and that of the present time is shown by the questions here given. A person might cram up by book work for such an examination, but, at the present time the important thing is that the student has done the work.

NORMAL SCHOOL FOR UPPER CANADA, TORONTO

EXAMINATION PAPER

For His Excellency the Governor General's Prizes in Agricultural Chemistry, Vegetable and Animal Physiology, and the Chemistry of Food.—(Value of the first prize, £5; of the second prize, £3, in books.) —April 7th and 9th, 1849.

PART 1ST—APRIL 7TH

1. What is the object of the study of Agricultural Chemistry?
2. Name the forces whose effects it is the province of Chemistry to investigate? Describe their mode of action, and state the distinction existing between Chemical forces and other forces influencing matter?
3. Into how may departments is the Science of Chemistry divided, and of what do they respectively treat?

4. Name the so-called organic elements? Associate with each its symbol, combining number, specific gravity, and remarkable properties? also state the names of some compound substances of which one or more of these elements form important constituents?
5. Name the so-called inorganic elements which usually enter into the composition of vegetables and animals.
6. What is meant by the term "adhesion," or "heterogeneous attraction?" Into how many orders is adhesion divided? Illustrate its several orders by examples.
7. What is an acid? a salt? an alkali? Give examples of each class, and affix to each sample its symbol.
8. What is Carbonic Acid? Give its symbol. How many pounds of Carbon are there in two hundred and twenty pounds of Carbonic Acid? How would you exhibit the presence of Carbonic Acid in air? in limestone?
9. How would you exhibit the presence of Carbon in plants? of Nitrogen in the atmosphere?
10. Exhibit the exact composition of Atmospheric Air. State its pressure on the square inch. What products are formed by the passage of lightning through the atmosphere? Give their symbols. In what ratio does the Atmosphere decrease in density as you rise above the level of the sea?
11. What is the composition of Water? What are its most important properties?
12. What is Oxidation? What is Combustion?
13. Name the inorganic acids and oxides, salts and alkalies, commonly found in vegetables, and give their symbols.
14. What is the nature of caloric? How does it affect bodies? In how many states may it exist? What measure of caloric is required to convert water into steam? Upon what circumstance does the boiling point of water depend?
15. How would you illustrate, by examples, the conversion of latent into sensible heat, and the contrary? Explain the phenomena of freezing mixtures. State the effect which an evaporating substance will produce upon surrounding bodies.
16. What is the cause of the development of heat during the decomposition of vegetable or animal matter?
17. Explain the phenomenon of dew. What is the dew point? state the conditions required for the formation of dew. How would you exhibit the deposition of dew? Why does dew fall sooner on some bodies than on others?
18. What is Silica? What purpose does it mainly serve in the economy of vegetables and animals? What conditions are necessary in order that water may dissolve it?
19. In what form does phosphorus exist in vegetables? What do you mean by phosphates? Name the phosphates usually found in animals and vegetables. In what state does phosphorous exist in the inorganic world?
20. What remarkable property is common to potassium and sodium?
21. State into how many parts a vegetable may be divided, with respect to its structure, and name them.
22. Trace the course of the sap; mention the changes which are supposed to take place when it arrives at certain parts of the plant.
23. What are the functions of the roots? Of the leaves? How do the trunks of dicotyledonous vegetables increase in dimensions?
24. State the source from which plants derive their organic elements; and give the symbol of each compound you may mention.
25. State the distinction between proximate and ultimate principles, and name the proximate principles found in any considerable quantity of vegetables.
26. What are insomeric compounds? Give some examples which occur in Vegetable Chemistry.
27. Name those proximate principles which are common to plants and animals.
28. Illustrate the composition by means of symbols; first, of grape sugar; second, of cane sugar; third, of gum; fourth, of starch.
29. Into what proximate principles may grape sugar be resolved when it suffers decomposition?
30. Explain the transformation, by means of symbols, which takes place when grape sugar is in part converted into alcohol, and then into vinegar.
31. From what sources are the inorganic elements of soils originally derived?
32. What elements are essentially necessary in the composition of a fertile soil?

33. In what state must all inorganic elements be, before they can enter into the composition of vegetables?

PART 2ND—ARTS. 9TH

34. What is the object of ploughing the soil? Explain the difference between surface ploughing and subsoil ploughing?

35. What is the object of draining? State the various effects which careful ploughing, subsoil ploughing and thorough draining may be supposed to produce upon the condition of the soil.

36. Name the depth, breadth, and width of the drain generally constructed for the purpose of thorough draining; draw a sectional diagram of two or three different kinds of drains. How far apart would you place your drains; first, in heavy land; second, in light land; and how would you place them in draining a hillside?

37. Name the inorganic elements which enter largely into the composition of the cereals.

38. State the composition of common granite rocks, and name all the substances which a decomposed granite rock may be supposed to give in the soil.

39. How may decomposition of the mineral substances in a soil be accelerated? What is clay, and how would you accelerate the decomposition of clay silicates? What object would be secured by such decomposition?

40. State the various reasons which induce the application of manures to the soil.

41. Illustrate, by examples, the various modes in which, first, vegetable; second, animal; third, mineral manures may fertilize the soil.

42. Why is farmyard manure a good fertilizer? What is the character of the fluid portion of farmyard manure?

43. State the nature of the change which takes place upon the decomposition of urea. Why is the resulting compound beneficial to vegetables? Give its symbol. What peculiar property does it possess, and how would you render it serviceable?

44. How could you accelerate the decomposition of organic matter in the soil? What purpose is served by the decomposition of organic matter?

45. Name the compounds which are the ultimate results of the decomposition of organic matter.

46. Explain the principles upon which the benefits arising from a proper rotation of crops are dependent.

47. What inorganic compound does milk contain in abundance? State the source of that compound, and the purposes it serves in the animal economy. With what substance would you manure your pastures in order to increase its quantity in the milk?

48. What is the composition of gypsum? of common salt? of lime? and for what purposes would you lime: first, heavy clay land, containing but little carbonate of lime; second, peaty soils?

49. State the composition of a marl.

50. What is meant by the fallowing of land? For what purpose do you fallow land?

51. What purposes do the proximate principles found in the vegetables which contain nitrogen serve in the animal economy?

52. What purposes do the non-nitrogenized proximate principles serve and in what form are they chiefly given off by the animals?

53. Give a list of the nitrogenized and chief non-nitrogenized proximate principles found in vegetables.

54. What inorganic substances enter largely into the animal frame?

55. Trace the course of the food from the mouth to the time of its mingling with the blood.

56. Trace the course of the blood from the left auricle of the heart, through the animal frame.

57. State the nature of the change which takes place in the blood when in the lungs. In what other parts of the system does a change take place in the chemical composition in an inorganic portion of the blood? Illustrate that change by means of symbols.

58. What peculiar property does the saliva possess, and what purposes does it serve in the animal economy.

59. Upon what order of adhesion is the effect of alcoholic liquors supposed to be dependent?

60. What is the theory of the transformation which takes place when milk

is brought in contact with an animal membrane, as in the curdling of milk?

61. Explain the reason why meat well boiled in large quantities of water is not nutritious. And how would you prepare the strongest soup from a given quantity of meat? In what way would the mode of preparation differ, if you prepared the meat alone for consumption?

62. Why is salted meat deficient in nutritious qualities?

63. From what source do the young of mammiferous animals derive their bony structure? Express the chief proximate inorganic principles in symbols.

64. Upon what four conditions is the healthful flow of the various aqueous currents in the animal body and in the vegetable dependent?

65. What is the primary cause of "colds," and of that determination to disease which has of late years been exhibited by many vegetables, especially in the tubers of the potato?

66. What remedy, in part, would you suggest with reference to vegetables?

N.B.—An oral Examination to take place after the time for answering the foregoing questions has elapsed, for the purpose of ascertaining the relative knowledge of the candidates on the subject of Practical Agriculture, as well as their aptitude to communicate a knowledge of Agricultural Chemistry, in all its branches.

The Examination was conducted on paper—eight hours in all having been allowed to the competitors to write out their answers to the questions, which, for the first time, were placed before them on their entering the Lecture Room for examination. One of the Examiners presided to see that no competitor received any foreign assistance in the preparation of his or her answers. At the expiration of the time allowed for preparing the answers, they were all collected, and subsequently examined and compared with great care by the Examiners.

So far as can be gleaned from the meager history of Education in Ontario, even though what might be called a strong course was given in the Normal School, little progress was made, and agriculture was not taught in any other school. In 1870, Dr. Ryerson made an earnest effort to revive the teaching of agriculture and actually prepared a text book himself, entitled "First Lessons in Agriculture, for Canadian Farmers and Their Families." This text was authorized by the Council of Public Instruction for Ontario and is now interesting for two things, (1) it gives evidence of the tremendous enthusiasm of the author whose agricultural training consisted only in his experience as a young man on the farm, and (2) it shows the method of teaching employed at that time. The body of the book is made up of question and answer, catechism style, and is intended wholly to give information. It is needless to say that such a method would really kill off any enthusiam in teacher and pupil, and therefore the results, so far as we understand agricultural education to-day, would be anything but hopeful. So far as the records show, classes were carried on only in the Normal School and they were discontinued in about seven or eight years.

In 1889 the regulations amending the Public School Course of Study made agriculture obligatory in Rural Schools in Forms IV and V. In Form V a text book was to be used and immediately after this (1890) a text book was prepared by Mills and Shaw of the Ontario Agricultural College, and authorized by the Department of Education. Although the subject was made obligatory for Rural Schools, there is little or no evidence of its having been taken seriously at all.

About this time "Nature Study" began to develop, soon becoming very popular in the Province, and whatever agriculture may have been introduced because of the fact that it had recently been made obligatory, dropped out and gave place to Nature Study. In 1904 a Nature Study branch was established in connection with the Macdonald Institute, Guelph, and linked up with the On-

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tario Agricultural College. This work was carried on until about 1912, and is important because of the fact that, from the work done in this Nature Study branch of the Ontario Agricultural College, the scheme of agricultural education as it is to-day in Ontario had its birth. Professor S. B. McCready was in charge of the work at that time.

Up until 1913, no classes in agriculture had been established in the High Schools, although, according to the regulations, some agricultural topics might be elected by the High School pupils if such election be concurred in by the Principal of the school and the Trustee Board. A text book was prepared by Dr. C. C. James, and authorized in 1898, with the intention that it be used in connection with any classes that might be introduced into either the Public or High Schools.

In 1907 district representatives were appointed to convey to the farmers of the country definite agricultural instruction, and to give instruction in agriculture in the High School located in the place to which the representative was sent. A representative was appointed in 1907 to each of six High Schools—Galt, Morrisburg, Perth, Lindsay, Essex and Collingwood. (It might be stated here that there is now at least one representative in each county). In four or five years these representatives abandoned the teaching of classes in their respective High Schools and devoted the time at their disposal to what might be termed extension work. In 1911 or 1912 School Fairs were organized here and there by these officials in co-operation with the Public School Inspectors and these Fairs have been growing in number and importance ever since.

It should be pointed out that where district representatives were employed, the Board under an Advisory Council was expected to carry on Departments of Agriculture in High Schools in order to meet the educational needs of those who did not expect to enter either a University or any of the so-called professions. It might fairly be said now that these departments were in no way a success so far as agricultural education in a High School is concerned. Yet, in some respects the move to establish such departments with teachers who were graduates of the Ontario Agricultural College in charge, was the most important move ever made in the direction of establishing regular agricultural classes in High Schools. There is a considerable difference of opinion now as to why this move did not meet with success.

During the years 1909 to 1915, considerable progress was made in bringing the subject before the attention of the people, and the problem was attacked from various angles. Summer courses in agriculture for Public School teachers were established, short courses for Inspectors were given, grants were provided for carrying on classes in agriculture in the Public Schools, and efforts were put forth to induce Boards and teachers to provide school gardens.

In 1912 the Dominion Government made an appropriation of $500,000, under *The Agricultural Aid Act,* to enable the Provinces to carry on the agricultural instruction already begun, and to establish additional activities as might be required. This grant was made pending the passing of *The Agricultural Instruction Act,* (assented to June 6, 1913) and the adoption of a line of policy to be followed out in the expenditure of the money. After the passing of *The Agricultural Instruction Act* a policy was outlined and Dr. C. C. James appointed Commissioner. The Act appropriated $10,000,000 to be available during the ten years ending March 31, 1923, and was divided

among the different provinces on the basis of population. The money was to be used for *education, instruction* and *demonstration,* and the provinces as represented by the Departments of Agriculture and of Education were to be free to draw up plans for the expenditure of the grants. These two Departments of the Provincial Government were intended to have equal share in the responsibility for the uses to which the money was to be applied.

The financial support thus secured enabled those in charge of agricultural education in Ontario to plan a broader basis and to build more permanently thereon. The financial requirements of the situation seemed to be secure for the next ten years (Details concerning the terms of *The Agricultural Instruction Act* can be obtained from the report of the Commissioner from year to year). As is the case with all phases of education, the paramount factor is the teacher. Sufficient evidence was at hand to demonstrate clearly that, unless teachers could be secured who had some training in agriculture, no permanent progress could be expected. Following up this idea summer courses in agriculture were provided for teachers at the Ontario Agricultural College.

A summer course in Nature Study for Public School teachers was established in 1909, at the Macdonald Institute, Guelph, with an attendance of about fifty, and at the same time a class of six teachers received instruction in topics somewhat similar to those given to the class in Nature Study, but under the heading "Elementary Agriculture." This was the beginning of the courses now carried on at the Ontario Agricultural College, at Whitby, Kemptville and Monteith in summer sessions. (For details of these see reports of the Minister of Education of 1916 and following).

In 1913, courses were provided at the Ontario Agricultural College for High School teachers and Normal School teachers. This course led to an intermediate certificate in agriculture and qualified the teacher to teach agriculture in a Public or High School. The work pertaining to this course is given only at the Ontario Agricultural College, and has been carried on now for ten years. (See report of the Minister of Education for 1916 and following).

All the teachers of agriculture in the Normal Schools are now holders of intermediate agricultural certificates and have been giving instruction in this subject for eight years.

With respect to financial assistance rendered by the Provincial Government in aid of this work, it should be stated that grants were made as early as 1907. The following, taken from the report of the Minister of Education of 1907, page 175, shows that a beginning had been made. "In 1906, $2,000 was voted for Elementary Agriculture and Horticulture, but only $124.50 of this sum was spent". In 1921, however, 15 years later, $109,900 was paid out in the form of grants in support of the work as now carried on. Of this amount, $40,000 came from the federal appropriation. At the present time, financial assistance is given to both Boards and teachers—to the former as a refund of expenses for equipment for teaching agriculture, and to the latter as an encouragement to take the courses provided and to carry on the work. (For details see circular No. 13 of the Department of Education and the Minister's Report from year to year).

To summarize the results, so far as attendance at the summer courses is concerned, a table is here given:

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Attendance at the Ontario Agricultural College Summer Courses in Agriculture

Year	Elementary I Men	Elementary I Women	Elementary II Men	Elementary II Women	Intermediate I Men	Intermediate I Women	Intermediate II Men	Intermediate II Women	Intermediate III Men	Inspectors I	Inspectors II	Farm Mechanics	Total
1911	3	37	1	46									100
1912	36	61	2	18									106
1913	14	64	3	36	23	4							146
1914	6	35	3	13	13	4	14						126
1915	11	39	3	18	14	1	9	1					105
1919	11	39	9	31	15	3	14	1					183
1921	13	138	2	81	9	1	13	2				10	276
1918	6	147	2	119	20	11	9		9	79	9		456
1919	16	151	6	160	9	19	7	21		86	10		489
1920	20	116	10	185	7	25	19			8	10		374
1921	61	161	36	86	24	15	16	8	7		7		428
1922	54	178	27	151	15	12	18	15		4			471

Attendance at the Whitby Ladies' College Summer Courses in Agriculture

Year	Part I Elementary	Part II Elementary	Total
1919	70		70
1920	69	46	115
1921	80	50	130
1922	40	78	118

Attendance at the Northern Academy, Monteith, Summer Courses in Agriculture

Year	Part I Elementary	Part II Elementary	Total
1920	25		25
1921	17	8	25
1922	15	18	33

Attendance at Campbellford Continuation School, Summer Courses in Agriculture

Year	Part I Elementary	Part II Elementary	Total
1922	64		64

In order to show how much progress was made from year to year the following summary is given:—

Number of Public and Separate Schools qualifying for Grants, 1903-1922

Year	Number of schools	With school gardens	With home gardens
1903	4		
1904	7		
1905	6		
1906	8		
1907	2		
1908	14		
1909	16		
1910	17		
1911	33		
1912	101		
1913	159		
1914	264	208	56
1915	407	222	185
1916	585	554	261
1917	989	466	523
1918	1,020	588	432
1919	1,408	618	790
1920	1,648	702	946
1921	1,804	690	1,114
1922	2,047	796	1,251

The following table gives the number of High Schools qualifying for grants since 1915:

	Number schools	With plots	Number plots
1915			
Jan.-June	11	.....	11
Sept.-Dec	15	.....	15
1916			
Jan.-June	15	1	14
Sept.-Dec	20	1	19
1917			
Jan.-June	20	7	13
Sept.-Dec	21	7	14
1918			
Jan.-June	21	16	5
Sept.-Dec	26	18	8
1919			
Jan.-June	23	16	7
Sept.-Dec	30	23	7
1920			
Jan.-June	32	29	3
Sept.-Dec	25	24	1
1921			
Jan.-June	21	17	4
Sept.-Dec	28	17	11
1922			
Jan.-June	29	27	2
Sept.-Dec	30	27	3

Results Accomplished

By referring to the foregoing table it may readily be seen that nearly one-third of the Public and Separate Schools of the Province are now giving instruction in elementary agriculture, and about two-fifths of these schools are maintaining school gardens.

At first it was intended that such work as is now carried on in the classes in elementary agriculture would be applicable to rural schools, and financial assistance was given to these schools only. In the course of a few years (about 1917) it was shown that agriculture was not only applicable to such schools, but was actually carried on with more enthusiasm and apparent success than in the small rural schools. Agricultural grants were then extended to include all types of public and separate schools.

The chief beneficial results so far may be summarized as follows; (1) Improvement in school grounds, indirectly through the use of the school garden and flower beds; and in many cases, lawns are neatly kept. (2) More interest is taken in the work of the school by parents and pupils alike.

(3) Better attendance is secured up to the closing of school in June and also at the opening of school in September. This is brought about because of the fact that the best of the time in the school year for garden work is at the close of, and, at the opening of, school. (4) Additional interest is taken in the activities of the farm arising out of the problems taken up in school. In addition to the above, it should be pointed out that garden work provides material for arithmetic, language and geography. Moreover, a good garden is a work of art.

The High Schools in some respects are the most important factor in elementary agricultural education because of the fact that the pupils of such schools are at an age when lasting impressions are made, and because in some respects they are the training ground for teachers. From the records shown above only thirty secondary schools out of a total of about three hundred and seventy, or less than one-twelfth, are giving instruction in agriculture.

Until 1921, the subject was counted only as a bonus and had no recognition as an educational subject at all. Since 1922, however, agriculture may be elected instead of biology in the first and second years of the High School course, and instead of physical science of the third and fourth years. This substitution is accepted for Junior Matriculation and for entrance into the Normal Schools. Those who take the four-year course in agriculture are given an elementary certificate in this subject. Those who do not elect agriculture in the High School course are required to take two summer sessions in order to secure an elementary agricultural certificate.

Financial assistance is given to both the Board and the teacher, but, so far, not much effort seems to have been

made by the High or Continuation Schools to undertake the teaching of agriculture, as now provided for. (Refer to the High School Course of Study, 1922, page 35, and to the Regulations of 1922, page 23).

In Ontario there are seven Normal Schools with an attendance of about 1,700 pupils. Regular instruction in agriculture (with the aid of a good school garden) is given in each of these schools, by a teacher especially qualified. Under this arrangement each teacher-in-training receives instruction in agriculture, not only in methods but also in elementary agriculture itself. More advanced work could be carried on than is now the case, if the High Schools generally undertook the work now provided for as an option.

The Summer Courses in agriculture are given with a view towards fitting, as far as possible, those who are to teach agriculture in the Public and Separate Schools, and in the High Schools. A two-session course is given for those who intend to teach in the Public (primary) Schools, and a more advanced two-session course is given to those who are to teach in High (secondary) Schools. The former leads to an Elementary certificate in agriculture and the latter to an Intermediate certificate. Any teacher may enter the course leading to an elementary certificate, but only those qualified to teach in a High School may be admitted to the course leading to an Intermediate certificate.

Those who hold Intermediate certificates and who are Specialists in Science may take a third summer session and qualify for a Specialist's certificate in agriculture.

A summer course in Farm Mechanics is offered to any one holding an Intermediate certificate in agriculture.

A specialists's certificate in both Agriculture and Science may also be obtained on either of the following qualifications:

(1) A First-Class Grade A or a High School Assistant's certificate granted on the Science option under the amended Regulations of 1917, with the degree of B.S.A., after the prescribed course at the Ontario Agricultural College.

(2) A Faculty Entrance certificate granted on the Science option with the degree of B.S.A., after the prescribed course at the Ontario Agricultural College, and with the professional certificate obtained after the prescribed course for Science and Agricultural Specialists at the College of Education.

The chief difficulties in the way of a more general acceptance of Agriculture as a regular subject on any school course are about as follows: (1) The people have an inherited objection to the classing of Agriculture as an educational subject. It is looked upon as work, not as education. (2) As a general rule, farmers themselves are opposed to it because they see people in the city—professional, commercial and industrial—are able to gain a much greater competency with less expenditure of time and energy. Therefore they want their children to leave the farm. (3) Higher institutions of learning have until recently refused to recognize a course in Agriculture as education at all. Hence, where a student looked forward to a university course he naturally avoided Agriculture, even if offered to him, and took those subjects which were recognized for entrance into the institution.

Although many people are theoretically in favour of some kind of vocational agriculture, yet, when plans are laid for it, very few boys can be found who are willing to attend, because the work offered in such vocational school leads only to the farm. Excepting the few who may be rich enough to start in agricultural pursuits for themselves, the outlook is none other than that of a hired man, and this is not attractive. Almost

no vocational agriculture has been established in Ontario so far. A few Secondary Schools have organized and commenced what have been called Departments of Agriculture with some promise of success in a few districts in which more or less specialized agriculture is carried on. It is hoped, however, that through evening classes and short courses, some vocational agriculture may be permanently established in the future.*

* See Regulations Respecting Department of Agriculture and Household Science, 1915.

SCHOOL EXHIBITIONS, NOVA SCOTIA

By L. A. DEWOLFE, B.A., M.Sc., Director of Rural Science Schools

SCHOOL Exhibitions attract considerable attention each year during the months of September and October. In some lines the standard is maintained, and in others, improved. An improvement in organization is particularly noticeable.

One defect which is difficult to remedy is the lack of a standard in judging vegetables when local judges are employed. For instance we saw very large, deformed potatoes given first prize at a local exhibition by a local judge; and when the same potatoes were sent the next day to the county exhibition, the professional judge gave them no consideration. The boy who exhibited them cannot understand why judges should disagree. It seems necessary to train one or two judges in each locality.

Children should not expect prizes on defective or diseased material; neither can they expect attention to exhibits that do not conform to the prize list. Collections of insects or plants unnamed are not valuable. Such exhibits should be accompanied by explanatory notes in order to make them educational. Bouquets are almost invariably bad. Too many flowers are crowded into a vase, so that it simply becomes a bunch rather than a bouquet.

Several exhibitions include reading contests, spelling matches, etc. These are good when properly conducted but too often the "reading" is mere sing-song and the "spellings" are not well chosen for the grades in the contest. Health songs and health posters are becoming common. School parades are effective in attracting public attention.

At some county exhibitions the children's department is a big feature. At others, it is a side show, or does not exist at all. The importance placed on it depends partly upon the vision of the secretary-treasurer, partly upon the local teachers, and partly upon available prize funds. In provinces where the prize money is drawn from government sources and where organizers and assistants can afford to set up and judge the exhibits, the success is greater than with us where we must depend upon local support. A grant sufficiently large to enable us to send representatives to each county exhibition and to contribute to the prize list would produce very beneficial results.

We admit that training children to work only for money prizes is bad; but while grown-ups urge that phase of it, children cannot well be taught otherwise. Parents encourage exhibitions not for their educative value but for the money the children may possibly win. To make sure of a prize, the parents too often do all the work, and merely use the children's names. They will sign a certificate that the exhibits are the product of the children's work. We need not fear, therefore, that the generation of "grafters" and "parasites" will soon die out.

SCHOOL FAIRS AND SCHOOL AGRICULTURE NEW BRUNSWICK, 1923

By A. C. GORHAM, Director of Elementary Agricultural Education

MANY school fairs were held last fall although the season in New Brunswick was cold and dry, and to some it looked as though there would not be sufficient from the plots and gardens to make a worth while exhibition. However, some thirty-one fairs were held in which eighty schools took part, and in most cases, although some classes of vegetables were not as well matured as in other seasons, the exhibits were excellent.

The United School Fair

The organization of the United School Fair in which two or more districts take part has been encouraged because it makes it possible for the officers of this Department to examine the work of a larger number of schools than if separate fairs were held. They are, however, with our present method of carrying on, rather more difficult to organize than the one district fair. Our plan has been to select a section where two or more schools may conveniently unite to hold a fair. If there are a number of schools exhibiting, the most central district, or the one having the best facilities is chosen. This plan is submitted to the teachers and trustees of the different districts, and they are asked to communicate with one another with a view to making arrangements for the fair.

The uncertainty attending this method of organizing by correspondence is overcome where the organizing is done by the Agricultural Representative, as he is in a position to give practical assistance with the plans. Thus far, our district representatives have been unable to conveniently cope with the situation, although some assistance has been given in some sections.

In this connection a very important suggestion was made at one or two of the fall fairs. It was proposed that a committee be appointed composed of representatives from the board of trustees, teachers, Women's Institute or other organizations, so that the arrangements for the school fair may be dealt with at the proper time and that it may be made a permanent event and not neglected through the frequent changing of teachers. Special meetings will be held to carry out these suggestions.

As to the comparative educational possibilities of the United School Fair as compared with the one district fair, the larger fairs are important especially from the standpoint of organization and to broaden the horizon of the girls and boys through the inter-scholastic competition. Yet the one-room school fair should not be despised because, through it, much more may be accomplished educationally as there is better opportunity of pointing out to the pupils and parents the objects of the work.

The School Fair and County Fair

Some of the school fairs were held in conjunction with the County Fair, and while sufficient space was allotted for the exhibits and they were brought to the notice of a large number of people, yet, as a general thing, the fair held under such conditions is not as productive of good results as when held separately.

The Prize List

A prize list is published by this Department and sent to each district for the guidance of the pupils in preparing exhibits. There is a long list of sections in each of the following classes: Vegetables, Nature Study

work such as collection of wood specimens, leaves, ferns, weeds, drawings, essays, statements of profit and loss in connection with home plots and poultry projects; also Poultry and Manual Training exhibits and Domestic Science articles —sewing, canning, preserving, cooking, etc. These are to be prepared under the supervision of some competent person, as the Domestic Science teacher or under the guidance of the members of the Women's Institute.

Prizes

The prizes are usually given in the form of money. Forty per cent of the total amount of the prize money is contributed by the Department of Agriculture, the remainder, 60 per cent, is furnished on the day of the fair by the district. This may either be granted by the trustees or, as is often the case, the money is obtained through the sale of produce from the gardens or from the sale of other articles on fair day.

Much interest has been shown in the school fair by public spirited persons and local societies. Members of the Women's Institute and the Daughters of the Empire have contributed much in time and special prizes to encourage the youthful exhibitors to take part and reap the full benefit of this form of practical education.

A certain bank and a large business concern have very generously donated respectively prizes in the form of a silver cup and boxes of fancy wares.

Directions for Organizing

A pamphlet has been prepared by the Director of this work to aid teachers and trustees in organizing a fair.

Practical suggestions are made as to method of organizing and management, securing judges, appointing of committees, and working out a programme for the public meeting on fair day.

Judging

The work of judging at each fair is supervised by the Director or some official from this Department. A pamphlet has been prepared which will serve as a guide to the judges. Local judges are secured, usually two for each class of exhibits. The larger number of judges helps to distribute the work and gives better satisfaction generally. Judgments are less liable to adverse criticism when two or more judges are working together.

The pamphlet explains what judging involves; the educational value of competition; gives a score card and standards for judging vegetables and poultry.

The School Fair and School Work

All exhibits must be the result of systematic work throughout the year to be of the greatest value, and it is a noticeable fact that the most successful fairs are those which are carefully planned months in advance. Conversely, it will be seen that one of the objects of the fair is to make it act as an aid and a stimulus to the teaching of Nature Study and Agriculture in the school; to help teachers to use the nature study method, which is the observational and investigational method. It makes use of the child's great curiosity regarding the things of nature in his environment. The pupil will be encouraged to carry out small but worthwhile, purposeful projects for the fair. This not only interests the pupils but the parents as well. This interest is the first requisite of good teaching.

Through the fair and its various exercises much may be done in the way of correlating subjects. For example, it has been noted by teachers and pupils at united school fairs that districts of close proximity produce very

different results in the vegetable crops. This was very noticeable during the past season.

The writer believes that these differences are due not alone to the superior knowledge of the youthful gardeners of one district as compared with those of other districts, but also to slight differences in soil and climatic conditions. Such factors being taken into consideration as altitude, exposure, humidity, early and late frosts, proximity to large bodies of water, currents of air from off the land or ocean, etc.

The effects of such varying conditions are brought to the notice of teachers and pupils so they may study them more closely and use the information in the correlating of certain subjects as Geography, Nature Study and Agriculture.

When spring comes and the poultry projects are taken up and the home plots and gardens are sown, the pupils may be taught to keep records and to find the cost of production. In fact the carrying out of these exercises is stipulated in the agreement made between this Department and each pupil at the time of taking up the project work. The teacher and parents also sign the agreement.

A real practical lesson in civics may be taught in organizing and managing the fair. The writer was greatly pleased this year when he found that at many of the fairs committees had been appointed from among the pupils, and that they had carried out their work faithfully and effectively.

The moral side of the question is not to be overlooked. The children are learing now to co-operate—how to live together—which is really one of the great lessons that the world is finding hard to learn. In all this competition between districts and between pupils, they may be taught to take failure without resentment and success with modesty, always emphasizing the spirit of fair play.

ONTARIO THREE-MONTH SCHOOLS

By L. STEVENSON, B.S.A., Supervising Director

THE three-month schools in elementary agriculture and domestic science for the rural young people of Ontario have this winter been increased to twelve. In 1921-22, when they were just organized, four such courses were held, and in the winter of 1922-23, on account of popular demand, the number was increased to eight. The courses are conducted by the Agricultural Representative, assisted by resident teachers and visiting specialists. They are being held this year at the following places:

Barrie (Simcoe, North and South); Lindsay (Victoria); Keene (Peterboro); Kingston (Frontenac); Brinston (Dundas); Renfrew (Renfrew); Essex (Essex); Belmont (Middlesex and Elgin); Exeter (Huron); Ancaster (Wentworth); Fergus (Wellington), and Caledon (Peel).

Instruction is given for boys in animal, field and poultry husbandry, farm dairying, veterinary science, horticulture and vegetable growing, soils, fertilizers, farm mechanics, drainage, beekeeping, botany, economics, and public speaking, and in household science, nursing, sewing and millinery for girls. The schools are held during December, January and February, and their object is to give practical instruction to those who have been unable to take up this work in regular institutions.

JUNIOR JUDGING COMPETITIONS

By J. A. CARROLL, Agricultural Representative, Peel County, Ontario

THE Junior Farmers' Association, Peel county, Ontario, held its fourth annual stock-judging competition in October last, thirty young men from different parts of the county competing. Substantial prizes were awarded on the following classes of stock, judged on the farms of local breeders: Dairy Cattle, Beef Cattle, Sheep, Swine, Horses. The two boys with the highest aggregate scores were given a trip to the International Fat Stock Show and Boys' and Girls' Congress held in Chicago in December.

A Home Economics Judging Competition for girls was held concurrently with the boys' competition, and will probably be made an annual event. In previous years, teams of three girls representing different branches of the Junior Institute participated in similar contests held at county and township fairs, but this year the contest became an individual competition with prizes for the following classes: Cake and School Lunch; Apron and Pillow Covers; Centrepieces and Towels; Butter; Good Dressing; Bread and Tea Biscuits.

Forty-eight contestants judged the exhibits, which were supplied by the senior Women's Institute and interested persons. The Brampton Girls' Club supplied the models for the Good Dressing class. The contestants were required to give the reasons for the placings. The two girls ranking highest in the aggregate were also given a trip to Chicago.

At the conclusion of the competitions a union supper was held, arranged by the joint executive and participated in by both Junior Women's Institute and Junior Farmers' Institute competitors.

IMPROVEMENT OF SCHOOL GROUNDS

"DURING the summer of 1915," states Mr. F. W. Bates, Director of School Agriculture for Saskatchewan, "a fine two-roomed school was erected in the village of Creelman. This school was placed in a ten acre plot which had been secured three years previously. The school board at once set out to make the grounds a real beauty spot, and was one of the first to take advantage of the plan whereby the Department of Education arranged for the free distribution of trees, shrubs and perennials for school planting. In consultation with the School Agricultural Branch, a planting plan was prepared for the grounds and in the spring of 1916 both trees and perennials were planted and the plantations did well.

"In 1921, the services of a man who took great pride in improving the grounds were secured. At the request of the School Board, a further supply of shrubs and perennials was sent. Since that further progress has marked the passage of the years, until, among others who have remarked on the appearance of the grounds, Hon. C. A. Dunning was particularly pleased on a recent visit which he paid at Creelman."

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

CANADIAN LIVE STOCK INDUSTRIES

The Marketing of Meat Producing Animals and their Manufacture under the Stock Yards and Abattoir System

By E. B. ROBERTS, Editor, The Industrial and Development Council of Canadian Meat Packers

System of Live Stock Marketing

CENTRALIZED marketing and large-scale meat manufacturing are the distinguishing characteristics of the Canadian live stock industry. The early stages by which the system developed were briefly as follows:

1. A rapid opening up within one generation of wide stretches of hitherto undeveloped lands in the Far West, lying between Lake Superior and the foot hills of the Rocky Mountains, and their use first as ranges and later for farms of smaller unit;

2. The equally rapid growth of meat consuming population, centred in the Eastern Provinces of Ontario and Quebec;

3. The necessity for all exports of natural products like meat having to run due East for a distance of between one and two thousand miles to the Atlantic seaboard.

Incidentally, these conditions sketch roughly the lines of national expansion for the last forty years in Canada. Nothing like the English, Scotch, or Irish weekly markets to which cattle may be driven on the hoof, was ever possible except in a few places. Even before the opening up of the Western Provinces, which gave the live stock industry its present day distinctive characteristics, conditions in the older provinces made such small markets difficult or impracticable. The distance between Montreal and Toronto, for example, is as great as that between London and Edinburgh. The contrast in physical conditions may be grasped when it is understood that cattle to-day are transported by rail from north of Edmonton in Alberta to be slaughtered in Toronto, a distance of almost two thousand miles.

Special methods of transportation had to be evolved or old methods adapted. Cattle, it was found had to be sent by carload and by trainload to large slaughtering centres. Hence the trade from the first had to be one of comparatively large units. The first step in marketing would be taken where a group of farmers would combine to send their stock to market by making up carload lots, for broken lots are generally less profitable. More and more, to-day, in the better feeding districts, the drover or cattle dealer, buying direct from the producer, gathers his cattle in carload lots, sometimes sorts them like with like, and forwards them to market. In almost every case these large markets, known in the Dominion as public

Bird's-eye view, from an airplane, of the Toronto Stockyards, the largest in Canada. In 1922, 363,162 cattle, 86,396 calves, 343,385 swine, and 231,603 sheep and lambs were sold on these stockyards. They cover thirteen acres of land. Adjacent, marked by figures, are three of the large meat packing houses. Their combined cold storage capacity is 17,000 beef carcases.

stockyards, are at large centres of population near the meat factories or packinghouses.

Naturally, long distance railway transport presented its own problems, and these had to be solved before the trade could flourish. At convenient places, such as between Winnipeg and Toronto, a distance of over eight hundred miles, there are three or four well equipped feeding stations where the cattle or other live stock must be detrained for a short time to allow them feed, water and exercise. The time limit over which animals may be confined in cars without such a break is thirty-six hours.

Stock Yards

When the live stock thus "shipped" —a general term used throughout North America for despatching, a survival of the early Colonial term when transport was by water— reaches its destination in the Eastern or Western provinces, it is unloaded directly into the public stockyards. These are situated at Toronto, Ont., Montreal, Que., Winnipeg, Man., Calgary, Alta., Edmonton, Alta., Moose Jaw, Sask., and Prince Albert, Sask. All those in use are modern in plan, and well equipped with open and covered pens for cattle, sheep and swine. The pens are generally arranged on a chess board system with alleyways twelve to twenty feet wide running between. The holding capacity of Canadian stockyards is from a thousand five hundred to ten thousand cattle at a time; one thousand to six thousand sheep or lambs; and from one thousand to eight thousand hogs.

The ownership of stockyards differs in different places: some belong to the respective Provincial Government, others to specially registered companies, and one or two are owned by leading railway companies. But their buildings and operation in all instances are under the inspection and supervision of the Dominion Minister of Agriculture. They must be adequately fitted to receive, hold and generally care for all animals in a manner approved by the Minister, according to the provisions of *The Live stock and Live stock Products Act.*

Meat-yielding animals, by car lot or mixed car lot, are usually consigned to commission men, or selling agents, who act for the farmer or drover. As the name implies, they work upon a commission basis, which is generally a percentage of sales. All acting commission men are members of the recognized local Live-stock Exchanges, under whose rules they work.

The principle buyers on the public stockyards are employees of the various packing houses, though there are also many so-called "small packers", local butchers, exporters, etc., whose competition on any stock-yard in the aggregate is highly important. A strictly competitive system of buying obtains, and prompt cash payment is the rule.

Buyers go around the pens, and after inspecting the stock, make bids to the commission men. All live stock is sold by weight: so much per pound is bid. The weighing is done independently on public scales and is part of the services rendered by the stockyard company. Every "ticket" or record of sale is made out in triplicate and is open to examination by any one. This system, after long experience, appears to satisfy all parties. The only factor of importance that alters from day to day is the price bid, which naturally depends on the market demand, quality and condition.

A small part of the live stock handled through the central markets is bought again by commission men,

acting on behalf of farmers who wish to feed for future marketing. This buying for " country shipment ", taking the place of the old-time monthly fair, is one of the ways in which farm stock is renewed in Canada. Live-stock purchased for the United States, either as stockers and feeders or for immediate slaughter, is dealt with in the same way.

The foregoing is, in outline, the Canadian method of cattle marketing. It provides the live stock raising farmer at the most distant part of the country with a complete chain of service. He does not see his cattle after they have left the farm, and has nothing more to do from that moment until he receives a cheque for the amount of the sale from the commission firm, it may be two thousand miles away.

The statistical tables below supply the most recent information available as to the number of cattle sold, the capacity of the stockyards, etc.

Capacity of Stockyards

—	Cattle	Calves	Sheep	Swine
Toronto (Union)	8,000	.....	6,000	7,500
Montreal (E. End, C.P.R.)	3,000	1,000	5,000	2,000
Montreal (Pt. St. Charles)	3,200	.....	.....	.....
Winnipeg (St. Boniface)	10,000	.....	4,000	6,000
Calgary	5,000	.....	2,000	2,000
Edmonton	2,500	.....	1,000	1,000

Marketings at Stockyards, 1921 & 1922

The cattle and calves marketed at the eight chief stockyards of the Dominion during 1921 and 1922, as reported by the Markets Intelligence Service of the Dominion Department of Agriculture, were as follows:

—	Cattle		Calves	
	1922	1921	1922	1921
Toronto	303,882	320,229	84,263	66,937
Montreal W.	33,078	36,399	53,040	56,164
Montreal East	34,021	38,972	57,336	46,725
Winnipeg	294,052	158,282	34,151	21,442
Calgary	89,429	79,896	16,307	13,213
Edmonton	88,447	39,706	12,827	5,287
Total	842,909	673,484	257,924	209,768

Where Canadian Live Cattle Go

The following table shows the number, value and destination of Canadian cattle exported in five year periods from 1890 to 1910 and every year thereafter:

Fiscal Years	Great Britain	United States	Other Countries	Total	Total value
	No.	No.	No.	No.	$
1890	66,965	7,840	6,649	81,545	6,949,417
1895	85,863	882	7,057	93,802	7,120,823
1900	115,056	86,989	3,479	205,524	9,080,776
1905	159,078	3,696	4,328	167,102	11,360,969
1910	140,424	12,210	4,752	157,386	10,792,156
1911	113,795	7,576	3,552	124,923	8,537,473
1912	47,868	9,807	3,842	61,517	4,098,179
1913	12,069	28,268	3,959	44,296	2,237,135
1914	9,788	206,446	3,615	219,849	7,906,794
1915	.....	183,672	2,252	185,924	9,267,534
1916	1,752	227,202	12,581	241,535	12,625,760
1917	.....	164,169	1,967	166,136	7,883,842
1918	.....	189,229	2,130	191,359	14,136,944
1919	.....	308,562	2,934	311,496	30,069,490
1920	479	500,216	14,830	515,525	46,099,553
1921	131	295,297	2,443	297,853	21,099,553
1922	35,418	172,981	5,105	213,504	8,538,051
1923	25,758	228,397	4,280	258,435	9,000,404

Abattoir Methods

Most of the packinghouses or abattoirs have been built on sites close to existing stockyards. As soon, therefore, as the buyer has had his cattle weighed, they are driven the short distance to the slaughter house. This is often only a stone's throw, though, occasionally, factories are so situated that re-entraining and a short railway run are requisite. If necessary, the cattle are re-classified so that steers of one type and quality pass together to the killing floor.

It is the claim of the meat packing industry that large scale slaughtering under the factory system is perhaps the most efficient and economical link in the chain from farm to table. Quickly, and without fuss or flurry, the animals pass one by one along the narrow alley, and are stunned by a sharp blow from a four-pound hammer by a skilled worker. As the beast falls, the side of the pen automatically lowers it to the floor where it is promptly despatched by gangs of men so arranged that, as soon as one beast is disposed of, another at once takes its place. When bled and partly flayed the carcase is raised by mechanical hoist until it hangs in the well known manner by the tendons of the hind legs. It is then hitched to a forward-moving chain on an overhead rail. The moment a carcase gets on the hooks, it starts on a journey that is the height of efficiency in butchering. Every process is rapidly and neatly done while the carcase steadily moves forward. One man takes but one operation and performs it on each carcase, never leaving his allotted space of two or three feet. As one carcase is finished, he turns to receive the next, leaving all other processes to be done in turn by men who stand farther down the line. The constant doing of the same operation leads to great skill and expedition, and the output under such a system is both standardized and economical.

Inspection

At this point the all-important meat inspection service comes in. This is one of the best organized features of the Canadian meat packing industry. The corps of inspectors at each packing house—or packing "plant," in the commoner term used in the Dominion—is under the direction of the Dominion Minister of Agriculture and responsible to no one else. It is the business of the inspectors, most of whom are fully qualified veterinarians, to examine not only every carcase that goes through a packing factory, but also the detached parts of that carcase, edible or inedible. They examine particularly the parts where unsuspected disease may lurk and watch closely for any lesions that might render the flesh unsuitable for human consumption, whether they be caused by disease or by accident, such as damage due to horn goring.

An elaborate system of tagging carcases and viscera is in use. For instance, should signs of tuberculosis be found in a tongue cut from a cow, it would be necessary to identify both the tongue and the carcase from which it came and to segregate each. This has been worked out so that automatically, when disease is discovered or even suspected to be present, the carcase and all its detached parts are at once marked "Held." They are then set apart from all others and cannot again pass into the general meat supply until and unless, after re-inspection, they are specifically passed as fit by a senior veterinary inspector. Should the carcase or the parts be found all right they go back with the products duly passed as wholesome. If not, they may be condemned outright or may be partly passed, *i.e.*, the affected portion only may be removed and destroyed, while the remainder may be tagged as fit for sale. Condemned carcases and parts go into a huge tank where they are steamed under high pressure to

render them innocuous, and even then may be used only for certain kinds of stock feed or for fertilizer.

Thus, every part and tittle of a meat-yielding animal going through an inspected packing plant in Canada is subjected to a minute scrutiny by a highly qualified, independent staff of Government officials. All packinghouses doing what is known as interprovincial trade and export beyond the limits of Canada must be so inspected. There is no alternative. All carcases or parts which have stood the test and have been found suitable for food are given a hallmark of purity, the words "Canada Approved" being stamped indelibly on every carcase or on every container of such parts as are put up in boxes or packages. This is the Dominion Government's guarantee of wholesomeness in the product. Only under a system of centralized marketing and manufacture would this appear to be possible.

But the endless chain to which the steer was first attached has not ceased to progress. When the carcases are passed and marked "Canada Approved," they proceed by the same chain to the cooling room, where they are held either until sold to the domestic wholesale trade or are shipped for export.

An excellent adjunct of the Canadian meat trade is the refrigerated railway car. By means of an ice cooling arrangement, the air can be regulated and maintained at a uniformly low temperature so that meat may be kept in the best condition. Carcases are always hung from ceiling hooks. For the overseas trade, these cars are run alongside the ocean-going vessel at Montreal, Halifax or St. John, and the carcases are transferred direct to the cold storage on board.

Little need be said here of an outstanding feature of the packing house system—the utilization of by-products, or in other words, the turning to profitable account of those smaller parts of the carcases, edible and otherwise, which in the old-fashioned butchering days were openly wasted. Everything tangible is used. Over one hundred and thirty different by-products can be obtained from cattle and swine. These are used for all sorts of purposes, from sausage casings to elaborately worked up pharmaceutical and cosmetic preparations. In fact, Rudyard Kipling's skipper of the collier out of Cardiff, who "would eat clinkers to save waste," has been far outdistanced by the meat packer in his effort to save. Who has not heard that in a hog all is utilized except the squeal? These economies have resulted in benefit to farmer and consumer alike, as they tend to increase the price paid to the livestock producer and to lower the price of meat to the consumer, the difference being covered by the sale of valuable by-products.

During the last year of the war, nearly one hundred and thirty million pounds of Canadian beef was supplied to the Allied Food Purchasing Commission. That, however, could scarcely be looked upon as a criterion of normal trade. On the whole, export shipments of beef are small compared to the export of bacon. The most noteworthy effort to test possibilities under actual commercial conditions was made between May and December, 1921, when seventeen shipments, totalling 1,200,000 pounds, were sent to Liverpool by a leading abattoir company.

The following extracts from an address by the secretary of the company will give an adequate idea of the reception given this beef in England, and may indicate also some of the advantages which, given a larger supply of good beef cattle on farms, the product might enjoy on that market. It will be noticed that, as the result of his personal study of the

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conditions under which the meat was sold, this officer came to the conclusion then that Canadian beef, placed upon the British market sixteen days after slaughtering in Toronto, could eventually be sold as fresh beef, in contradistinction to the chilled product shipped from other producing countries such as Argentina or South Africa.

"Between May and December, 1921," he said, "we sent to England seventeen shipments of chilled beef, totalling in weight 1,200,000 pounds. The total loss on the 1,200,000 pounds was $28,000, and we were forced to discontinue the shipments. However, an analysis of the results gives some ground for optimism. The loss on the shipments was equivalent to about one penny farthing per pound. We were convinced that the chilled beef which we shipped was worth on the British market 2*d*. per pound and probably 3*d*. per pound more than we actually received for it. And we were further convinced that, had conditions been such as to permit continuous shipments, this Canadian chilled beef would very soon have commanded a price relatively much higher than that received for our experimental shipments. Every butcher in England who handled the meat, acknowledged that it was good beef, but his attitude invariably was that it was 'imported' beef and should be bought at the imported beef price. Much of the frozen beef imported into Great Britain during the war was of very inferior quality and general prejudice was created against imported beef.

"But, if Canada could make regular shipments of chilled beef every week, what position would it ultimately establish for itself on the British market? My view is that it would in a short time command a price approximating the home killed price. The Argentine beef is marketed in England four weeks after slaughtering. Canadian beef can be marketed two weeks from the date of slaughtering. Canada has, therefore, a tremendous geographical advantage, which South America can never overcome.

"The British butcher, although he claimed that he should buy this imported beef at the imported trade price, actually paid us from 1*d*. to 2*d*. more than he was paying at the same time for South American beef. But he also did something that goes much farther in supporting my view. He sold our beef to his customers not as imported, but as home killed beef. And the only reason he was able to do this was that the beef was as good. It is this fact that gives me confidence that, granted the necessary conditions, Canadian beef would soon establish itself on a price level approximating that of home killed beef."

Early in 1923 the Dominion Department of Agriculture undertook a small experiment in exporting chilled beef to England. Only fifty carcases, totalling rather less than forty thousand pounds, were sent. Due to several causes which might not have existed under strictly commercial conditions "a decided poor return" for the consignment was reported.

Canadian Meat Industry

(Summary of Dominion Statistician's Report).

—	1921	
Number of plants	84	
Capital	58½	millions.
Number employees	9,928	
Salaries, etc	13½	millions.
Cattle killed	517½	thousand
Calves killed	181½	"
Sheep killed	715	"
Hogs killed	1,774½	"
Cost value, animals	86½	millions
Sales value, all products	153	"
Meats only—		
Weight	628	million lbs.
Value	124	millions

NOTE.—Values given in dollars.

Canadian Beef Exports

A very great increase in Canadian beef exports was recorded during war years. The quantity exported rose from less than a million pounds in 1912 to over 125 millions in 1919. Since then there has been a marked drop every year. The record since 1910 is as follows:—

—	United Kingdom	United Utates	Other countries	Total	Value
	lbs.	lbs.	lbs.	lbs.	$
1910	824,140	40,503	441,754	1,318,397	109,993
1911	482,371	1,957	490,083	974,411	91,844
1912	274,419	5,711	668 641	948,711	86,596
1913	782,920	19,474	768,585	1,570,979	135,111
1914	190,787	12,772,291	654,629	13,617,707	1,127,911
1915	1,330,482	17,697,917	642,302	19,670,701	1,988,489
1916	13,912,771	9,456,290	25,354,504	48,903,565	5,994,833
1917	15,179,195	10,039,593	20,327,388	45,546,176	5,750,435
1918	32,768,400	12,672,602	41,124,102	86,565,104	13,016,378
1919	91,644,900	32,965,700	1,192,300	125,802,700	26,594,814
1920	28,730,500	34,418,000	40,751,000	103,899,500	19,637,656
1921	8,883,800	36,037,700	8,585,100	53,505,600	8,504,589
1922	5,797,300	21,647,800	911,500	28,356,600	3,324,037
1923	7,987,800	18,264,000	2,776,700	29,028,500	2,932,573

NOTE.—A second article by the same author, dealing with Sheep and Swine, will be published in the March-April number.

IMPORTATION OF CANADIAN CATTLE TO GREAT BRITAIN

Representations made at the Imperial Economic Conference, 1923, by the Prime Minister for Canada and the Hon. Geo. P. Graham, Minister of Railways and Canals, extracted from *The Journal of the Ministry of Agriculture* for Great Britain, Vol. XXX, No. 8.

MR. GRAHAM: Mr. President, I am not sure just why a question of this kind should be brought before the Economic Conference unless it be to provide a jury at the trial of this question. This matter was thrashed out for a great many years, Canada strongly objecting that the reason given for shutting out her cattle that they were diseased was not founded on fact, and full investigation has proved the truth of the contention. There was no reason in our mind to exclude Canadian cattle for very many years under the Animals Diseases Act. Now, it has been stated that it is an eccentricity, I might call it, of British jurisprud-

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once, that you often call things by their improper names in the title of statutes, as the quorum of protecting children in the cinemas, etc. Well, in that case, there was no stigma placed on cinema men, the Act was careful in its title—true to make it mean something it did not mean—but it was careful not to place any stigma on the business of the cinema men. But in this case for many years we have suffered under the allegation that cattle disease was rampant in Canada, which was not the case. I might add just here that, although in a measure the embargo has been lifted, portions of our cattle under the enforcement of regulations are still suffering from the stigma, because when an inspector, in classifying the cattle landed declares that any cattle come under what might be called the "fat class," they are slaughtered on the dock as if they were diseased cattle under the Animals Diseases Act. There is no pretension by anybody that there is any disease in the cattle, they are not slaughtered because they are diseased, but are slaughtered because they are considered not to come under the technical stocker class. We think that is an incongruity and an injustice.

To come down to 1922, I must say with brutal frankness that the Canadian people are very much disappointed. After arriving at an agreement with the British Government along certain lines, we are disappointed to find out that the Statute passed did not comply with the terms of the understanding. There was a restriction defining "store" or "stocker" cattle placed in the Act which was not considered, I believe, at the Conference between the Finance Minister of Canada, the Minister of Marine and Fisheries, and the British Government. It has been stated that that was introduced by a private Member, and while I do not wish to criticize it, as that is the business of the British Government, I am inclined to think that, if the Government had resisted the amendment, it would not have been pressed, much less passed; but that is the business of the British Government.

Now I pass on to the present difficulty, because if the Act had been passed as was discussed at the Conferance, it would have left the door much wider open. I admit that there are difficulties in passing Statutes, in enacting Statutes of Parliament, perhaps on the inside that may not be discernible on the outside. I have had experience along that line myself. We have arrived at this stage. We do think that the Act, or that portion of the Act providing for the admission of breeding cattle or cattle capable of breeding should be made operative. It must have been so intended, else it would not have been placed in the Statutes, and we feel that, while we cannot press it further, it is a fact that the British Government is not complying entirely with the understanding arrived at between the two Governments.

A matter that has not been mentioned is this. Provision has been made now for classification as between stockers and fat cattle, and we contend that that was not anticipated in the Conference. But even under the Statutes as passed which contained the new restrictive clauses this inspection has been carried on not only with a detrimental effect to the Canadian cattle trade but with an injustice to the Canadian cattle trade. Stockers have to comply with certain restrictions—branding, detention and that kind of thing—to which fat cattle are not subjected. Then stockers have to be kept separate from fat cattle, and there are various restrictions to which what we call fat fat cattle are not subject. These cattle that are shipped as stockers

from Canada arrive at the port in Great Britain, and it is our contention, we think based upon fact, that the spirit of the Act, the spirit of the arrangement is not being carried out but is being nullified by the details of the inspection. In other words, that cattle that are really stockers or store cattle and capable of being fed for weeks and months with great improvement are placed in the category of fat cattle when they arrive here, and are not even allowed to be taken a few hundred yards to another abattoir, but are slaughtered on the docks. They are slaughtered under the Animals Diseases Act though they are not diseased, with great detriment to the reputation of Canadian cattle. Further, these animals which we contend are not fat, are slaughtered and their carcases must be sold. Canadian meat of an inferior quality is thus placed on the market. It is not fed up to the point of superiority of which it is capable, and Canadian beef is put down as inferior article because the cattle are called fat by an inspector and slaughtered that neither we in Canada nor you in Great Britain would under any other circumstances think of slaughtering for the market. It is not out of place for me to give a detail or two. Several head of cattle were sent over here a few days ago by the Canadian Government as store cattle, cattle that in our country would be considered stockers, cattle that I have no hesitation in saying your farmers would call stockers if they owned them, and would feed them at least until the Christmas trade arrived. There were some 60 of these. They were all eventually put down as fat cattle and slaughtered; showing a distinct conflict of opinion between our experts in Canada and the inspectors here. I could give other details.

Another question has been raised which I do not think was ever in the mind of the British Government, and that is, inspectors have undertaken to say not only that cattle are too fat but that others are too poor. Surely that was not the intention that the inspector was to classify the animal as one that should not be sold to a farmer to fatten if he wanted to buy it. There was in one shipment of cattle carried recently quite a number of exceptionally poor cattle. I had hoped to have had the photographs of them here to-day, but they have not arrived. These cattle were not considered too fat. They were considered too poor and not of the proper class of cattle for the British farmer to fatten. That surely is an intervention with trade not contemplated in the Act. To my mind under that Statute the inspector would have just as much right to inspect a horse of mine that I was selling over here and to say it was not fit for the market. The idea and the whole intention of the Act was that cattle should come over here to be fatted, and the class of animal would be a thing between the farmer here and the seller in Canada. I only mention that to show to what extent the inspection goes.

I do not know that I need go into any more details. We are thoroughly disappointed. I could read much stronger language than I would think proper to use, but we feel that not only are our farmers disappointed after being shut out of the market for 30 years on account of diseases which did not exist but that the agreement made is being disregarded. The door opened, cattle were coming in freely, and were being sold and purchased rapidly by the farmers here for fattening, but all at once, the door is in a measure closed. Now the shutting out of these fat cattle or of cattle that are called fat by inspectors, is of a far greater moment than it may appear. It has this result, that the raisers and stock

breeders in Canada are beginning to think that there is no use in endeavouring to take advantage any more of this market because they do not know whether an animal will be declared fat when it gets over here or not, and the slaughter of all these animals so declared to be fat animals, but which we contend are not, has always been done not only with loss to the immediate interest but to the detriment of the good name of Canada and the beef which our best cattle produce.

A suggestion was made by the Minister of Agriculture as to an arrangement for the interchange of pedigree stock. Possibly it would be of some benefit, but it will not cure the situation as to the exclusion of our good grade stock which might be capable of breeding. But the immediate trouble, and the greatest disappointment we in Canada have, is the fact that cattle we sent over as we believe under the Statutes are classified so as to nullify much of the good that should come to our trade under the Statute.

Then we cannot see why we should be used differently from any other Dominion. We would not at all say that any other Dominion should be deprived of anything it has on our account. Not at all. But we believe if trade is to be Imperial the benefits must be reciprocal. It is a fact, so I am informed, and is publicly stated in our Press, in an interview with the Montreal Gazette (perhaps one of the ablest newspapers in the British Empire) that Canada's cattle do not receive the same treatment as at least one other Dominion in that their cattle after certain days of quarantine in England are allowed to be sold anywhere either as stocker or fat cattle. All these restrictions are put against our trade. As I said in the first place, I am not sure this should be dealt with at the Conference or if it be a matter between the Canadian Government and the British Government.

I have endeavoured to place our side of the case as dispassionately as possible before the Conference. We think the spirit of the Act is being nullified by the system of inspection, and that the advantages which were intended to be had for Imperial trade are not being experienced; and as a result of it all, the Canadian farmer feels greatly aggrieved and greatly disappointed in that he is not getting what he was assured he was to get in the way of freedom of entry for his cattle into the British market.

Mr. MACKENZIE KING: In the first place, I should like to mention again what I said at the opening meeting that we appreciated in Canada the difficulties with which the British Government were confronted in this matter and appreciated sincerely the action of the Government in seeing that the embargo was removed, giving admission to our cattle. We wished to do something more than give verbal appreciation of that action, and we increased the British preference, amongst other things, in the hope that the British public would realize that having met us in matter in which we were vitally concerned we, in like measure, would like to meet them in a matter which was of concern to British interests. We increased our preference by giving an additional 10 per cent discount on the existing preferential duties on all goods coming through Canadian Ports. I want to make it clear that this was done largely as the result of the action of the British Government in respect to the admission of our cattle. We intend to hold what we have done.

Our attitude in the matter of preference is one of trying to further as much as we can inter-Imperial trade. The point which I think we stress most strongly—and it is a point, I think, which is felt equally on this

side—is the importance of carrying out whatever agreements may be reached in the spirit as well as in the letter. We have no desire to do other than live up to an agreement that we have made, and we expect the British Government to adopt the same attitude, not only by itself and its Ministers, but through its officials. We think the officials should be definitely instructed as to what is the agreement and understanding in the matter. As Mr. Graham has pointed out there was a definite agreement made between the Ministers of the Crown of Canada and the Ministers of the Crown here, as to what was to constitute the provisions of an Act of Parliament. That agreement was altered somewhat by an amendment to the Act. That was a disappointment, but we realize that the Government had its difficulties in a measure of this kind when it came into the House of Commons and the House of Lords.

However, the Act itself stands for the voice of the British Parliament, and at the moment we find a further disappointment in that the Minister of Agriculture tells us distinctly that, though the act has a clause referring to the admission of breeding cattle, which has been framed with a view to giving practical expression to another phase of the agreement, he will find it impossible to introduce the Order which would give force to that clause of the Act and make it of service to us. That must necessarily occasion another considerable disappointment. It distinctly cuts down the value of the legislation and distinctly limits what we hoped and expected would be the outcome of the agreement.

Now as to the difficulties, there again let me say that our Government are prepared to be as considerate in every particular of the difficulties with which the British Government is confronted as can reasonably be expected, but there is a limit to which consideration can go. If the Act in its provisions is to be whittled away clause by clause and what is left to be completely whittled away by the method of administration, of what avail is it? That brings me to the last point, namely the administration and regulations in regard to the admission of store cattle. As Mr. Graham has pointed out, that is really very serious, because it affects our cattle in two ways. In the first place, it brings back a certain stigma which the Minister has rightly stated was never justified, and which the British Government is anxious to have removed completely, but in the second place it gives to our beef in the British market a reputation which it does not deserve. Indeed it may conceivably help to destroy the very trade it was intended to further. If we send our cattle in as store cattle, lean and thin, and with the intention of having them fattened here, and they are slaughtered immediately and put on the British market as Canadian beef, it will not take very much in the way of marketing that kind of beef to destroy any reputation our cattle may have. One can see how the farmers of Canada would naturally be very sensitive on a point of that kind. I believe if the Minister of Agriculture will say that in carrying out of the legislation he will see that instructions are given to his officials to the effect that the spirit of the law must be lived up to, and that Canadian cattle coming in as store cattle must not be put into a classification into which they should not properly be placed, he will go a long way to remove what Mr. Graham rightly referred to as a feeling of great disappointment and some indignation at the moment. I think it is entirely to the interests of British trade with Canada and our trade with Britain that irritations of that kind should not be permitted to develop. If they start on one side there

is apt to be retaliation on the other, whereas all that we want is to carry out whatever agreement we have in a spirit of goodwill and liberal interpretation.

I might mention a concrete case that was brought to my attention this morning, of a shipment of cattle that was sent over from Canada to two different ports. The single shipment was divided into two lots, one lot of 50 being sent to one port and the other lot to another port. At the one port those stockers were classified as fat cattle and slaughtered immediately. At the other port they were admitted as stockers and so regarded.

The CHAIRMAN: All out of the same lot?

Mr. MACKENZIE KING: Yes, all out of the same lot. I do not mind saying that our shippers are anxious to find out how the law is being administered. This I believe was done designedly by one shipper who divided his shipment into half and sent half to each of the two ports, at the one port they were slaughtered immediately, at the other port they were admitted and regarded as store cattle. That is an actual fact within the past week. It bears out what I say, that some of the officials of the Departments are evidently over-zealous in taking a certain course, at some ports at least, and I think that what is most needed is that the Government itself should make known to its officials the view that was expressed by the Government to our own Ministers.

IMPERIAL FRUIT SHOW, 1923

CANADIAN AWARDS

AT the Imperial Fruit Show, held in October, 1923, in Manchester, England, Canadian exhibitors secured seven first and two second prizes in the Overseas Section, one first, one third and one fourth in the British Empire Section, a second and a third in the Small Exhibits Section, and five special prizes, including the Daily Overseas Mail Gold Cup.

Three provinces competed in the Overseas Section, namely British Columbia (three entries), Quebec (three entries) and Nova Scotia (one entry). The awards in this section were as follows:

OVERSEAS SECTION

Variety	Award	Competitor
Wealthy	1st	Associated Growers of British Columbia, Limited, Vernon, B.C.
McIntosh	"	Associated Growers of British Columbia, Limited, Vernon, B.C.
Jonathan, Cox Orange, Spitzenberg, Newton, Wagener, King, Spy, Greening	2nd	Macdonald College, P.Q.
Any other variety	1st	Associated Growers of British Columbia, Limited, Vernon, B.C.
"	2nd	United Fruit Companies of Nova Scotia, Limited, Kentville, N.S.
Snow	1st	Morley Honey, Abbotsford, P.Q.
Bledsheim	"	United Fruit Companies of Nova Scotia, Limited, Kentville, N. S.
Stark	"	United Fruit Companies of Nova Scotia, Limited, Kentville, N.S.
Golden Russet	No award	

On account of the small number of entries in this section, no third prizes were awarded.

British Empire Section

In the British Empire Section there were three entries from British Columbia and one from Quebec, the Associated Growers of British Columbia, Limited, taking first in dessert apples of any variety and fourth in cooking apples, with Macdonald College, Quebec, third in the dessert class.

Small Exhibits

In the Small Exhibits Section, H. L. Thompson, Ottawa, Ont., secured a second prize for dual-purpose apples, and the Coldstream Ranch, Vernon, B.C., a third in late culinary varieties.

Special Prizes

The following special prizes were secured by Canadian exhibitors:—

Class	Award	Competitor
Best exhibit in Overseas Section	Daily Overseas Mail Gold Cup (£50)	Associated Growers of British Columbia Limited, Vernon, B.C.
Best entry by any British Columbia Co-operative Organization	Goodwin, Limited, Silver Cup (£15).	Associated Growers of British Columbia. Limited, Vernon, B.C.
Best entry by any Nova Scotia Co-operative Organization.	Goodwin, Limited, Silver Cup (£15).	United Fruit Companies of Nova Scotia, Limited, Kentville, N.S.
Best British Columbia Exhibit in Overseas Section.	Poupart, Limited, (£10 in gold.)	Associated Growers of British Columbia, Limited, Vernon, B.C.
Best Nova Scotia Exhibit in Overseas Section.	Poupart, Limited, (£10 in gold).	United Fruit Company of Nova Scotia, Limited, Kentville. N.S.

ACCREDITED HERD REGISTER

Supplementary List

DURING the months of September and October, 1923, fully accredited herd certificates were issued to the following:—

PRINCE EDWARD ISLAND

HOLSTEIN-FRIESIAN

Howatt, C. M., Bradalbane.
Seaman, W. J., Bradalbane.

AYRSHIRE

Gregor, Walter M., Brackley Beach.

QUEBEC

AYRSHIRE

Black, Angus, Aubrey.
Byrne, Frank, Charlesbourg.
Coursol, A., Mont Laurier.
Coutus, Edouard, Ste. Elizabeth.
Deschamps, U., Repentigny.
Ferry, C. S., Huntingdon.
Hayes, W. T., Hemmingford.
Neily, Kerr, Huntingdon.
Paul, Napoleon, St. Germain de Grantham.
Ponton, Albert, Bromptonville.
Scott, M. G., Sweetsburg.
Sevigny, Francois, Hillhurst.
Vandal, Arthur, St. Simon de Bagot.
Whitcomb, P. J., Massawippi.
Wylie, W. C., Howick.

FRENCH CANADIAN

Coulombe, Damun, St. Norbert.

HOLSTEIN-FRIESIAN

Baker, E. F., Dunham.
Bessette, Ludger (Jr.), Richelieu.
Bromby, W. W., East Farnham.
Brown, F. L., Glenelm.
Brown, F. W., Huntingdon.
Elie, Antonio, La Baie.
Jordon, A. A., Coaticook.
Leggett, Verdun D., Herdman.
Nussey, Albert A., Brysonville.
Tannahill, H. S. & Son, Huntingdon.
Woodman, J. F., Hatley.

JERSEY

Jordan, A. A., Coaticook.
McLaughlin, O. A., Knowlton.
Poole, G. C., Hatley.

SHORTHORN

Ponton, Albert, Bromptonville.

ONTARIO

AYRSHIRE

Bradley, W. H., Lansdowne.
Cauham, Geo. L., Avonmore.
Douglas, W. J., Vankleek Hill.
McCormick, T. J., Rockton.
Meale, G. D., Vankleek Hill.
Smith, R. J. A., Hatchley Station.

GUERNSEY

Donley, D. A., Todmorden.
Sheppard, E. R., Aurora.

HOLSTEIN FRIESIAN

Ashford, J. E., Ancaster.
Baird, Chas., St. Marys.
Beggar, M. C., Jarvis.
Burrill, F. I., Burgessville.
Chalmers, Thos., Dorland.
Caesar, B., Hagersville.
Cowle, W. J., Locust Hill.
Dippel Bros., Walkerton.
Dunlop, D. A., Todmorden.
Gough, W. H., Bloomfield.
Huff, M., Bloomfield.
Hyde, E. W., Simcoe.
Kember, Guy, Sarnia.
Kitchen, J. D. & F. D. Culver, Waterford.
Levere, Levi, Spencerville.
Lindsay, J. A., Hagersville.
McQueen, T. W., Tillsonburg.
Moir, J. G., Smiths' Falls.
Nelson, P. B., Campbellford.
Passmore, F. S., Brantford.
Rivers, W., Ingersoll.
Sager, N. P., St. George.
Sager, W. & Son, St. George.
Schweitzer, E., Stratford.
Sheppard, E. R., Aurora.
Smith, Thos., Stratford.
Stuart, H. E., Simcoe.
Wilson, C. H., Hamilton.
Wood, Geo. E., Cainsville.
Wood, W. J., Cainsville.

JERSEY

Beckett, Taylor, Ridgeville.
Sheppard, E. R., Aurora.
Thompson, M. G., Bloomfield.

SHORTHORN

Dunlop, D. A., Todmorden.
Harrop, H. A., Hagersville.

MANITOBA

ABERDEEN-ANGUS

McConnell, Geo., Hamiota.
Parrish, W. L., Parkdale.
Riverview Ranch Co. (S. S. Carscadden, Mgr.), Virden.

HEREFORD

Crawford, J. W., Pipestone.
Fallis, R. F., Souris.
Robinson, F. W., Binscarth.

HOLSTEIN-FRIESIAN

Crawford, J. W., Pipestone.
Fallis, R. F., Souris.
Parrish, W. L., Parkdale.
Robinson, F. W., Binscarth.
Wilson, R. A., Macgregor.

RED POLLED

Munro, Thos., Portage la Prairie.

SHORTHORN

Barker, John, Katrime.
Dewar Bros., Lavinia.
Forrest, W., Oak Lake.
Guild, Jas., Elkhorn.
Purves Thompson Estate, Purves.
Rice, Freeman, Binscarth.
Vopni, J. A., Harlington.
Wilkie, J., Carman.

SASKATCHEWAN

ABERDEEN-ANGUS

Bullock, O. N., Bechard.

SHORTHORN

Cuming, Henry, Kipling.
Hill, A. L., Red Jacket.
Richardson, Jas. & Son, Moosomin.

ALBERTA

HEREFORD

Sharp, L. C., Clover Bar.

HOLSTEIN FRIESIAN

Leffingwell, F. S., Warner.
Mitchell, Jr. E. S., De Winton.

SHORTHORN

Leffingwell, F. S., Warner.
Stewart, Mrs. A. I. P. & A. S. Fowler, Mazeppa.

BRITISH COLUMBIA

AYRSHIRE

Bonnett, A. E., Kettle Valley.

JERSEY

Barton, E. H., Chilliwack.
Sangster, Geo., Victoria.

CERTIFICATES CANCELLED

The following certificates have been cancelled:

AYRSHIRE

Henderson, Henry N., Huntingdon, Que.
House of Refuge, L'Orignal, Ont.

HOLSTEIN-FRIESIAN

Deeks, J. D., Morrisburg, Ont.
Farrow, Frank, Waterford, Ont.
McCullough, F. H. & Son, Navan, Ont.
Risebrough, R. J., Newtonbrook, Ont.
Wood, J. A., Merrickville, Ont.

IMPORTATION OF ANIMALS FROM THE UNITED KINGDOM PROHIBITED

Under and by virtue of the authority conferred upon me by the provisions of Section 9 of the Animal Contagious Diseases Act, (R.S.C. 1906), I do hereby order that, owing to the existence of Foot and Mouth Disease in England and Scotland, all permits for the importation to Canada from the United Kingdom, of cattle, sheep, other ruminants and swine, with the exception of such animals as are actually at this date embarked on vessels en route for Canada, shall be and are hereby cancelled.

Dated at Ottawa, this twenty-ninth day of October, one thousand nine hundred and twenty-three.

(Sgd.) A. L. Jarvis,
Acting Deputy Minister.

CATALOGUE CARDS FOR AGRICULTURAL BULLETINS

In response to an application made to the Library of Congress, Washington, D.C., to have catalogue cards printed for the bulletins of the Canadian Department of Agriculture, the Card Division has agreed to print cards prepared in the Departmental Library, International Institute Branch, for the bulletins of the Federal Department of Agriculture of Canada. These cards will be available for purchase at Washington in the near future.

NEWS ITEMS AND NOTES

Canadian exhibitors made an exceptionally good showing at the International Live Stock Exposition, Chicago, in December last, taking many of the big premiums in the cattle, sheep and swine departments, as well as the World's Championship for wheat in a field of over two hundred entries. Altogether, in the grain classes, Canadian growers carried off about one hundred awards including two of the three championships offered and five first premiums.

The many prizes won by Canada in the grain section of the International Show support the claim that Canada produces the highest quality of wheat, oats, barley, peas, and alfalfa seed. The Canadian Seed Growers' Association, Ottawa, publishes a list of growers who are in a position to fill commercial orders for Registered or Extra No. 1 seed.

The honours coming to Canada in the live stock department at the International Show, Chicago, included the grand championship for Clydesdale stallions, and the grand championship Aberdeen-Angus bull. In the sheep classes, Canada secured a number of championships, including the grand championship carload of wethers.

In the stock judging contest held at Chicago, open to Agricultural Colleges, the Ontario Agricultural College team took second place, being thirteen points behind the winner, the Kansas State College. The individual championship as best student judge, was won by G. R. Patterson of the Ontario College, with a score of 908 points out a possible 1000.

According to an announcement made by the Minister of Finance, the Hon. W. S. Fielding, Dr. H. M. Tory, President of the University of Alberta, has been appointed by the Government to enquire into and report upon the question of agricultural credits, with particular reference to the recommendations of the enquiry made by the special committee on Agriculture of the House of Commons last session.

The Live Stock Commissioner for Canada has issued Report No. 3 on "The Origin and Quality of Commercial Live Stock Marketed in Canada, 1920-21-22". The report, which is mainly statistical, reveals the sources of the best and poorest offerings as well as the surplus volume of the different classes of live stock by provinces and districts, and is intended chiefly for the information of those engaged in promotion and extension work.

"With a few notable exceptions", states the Commissioner, "the report reveals a very urgent need for greater economy in production. Live stock is the medium through which the bulk of our fodder and coarse grain crops is marketed, yet practically every so-called live stock district is marketing an astonishingly small tonnage of good quality beef, pork and mutton. Lack of proper feeding appears to be more general than lack of good breeding."

At the National Dairy Show in London, Canadian bacon was awarded a first prize in the colonial bacon class. The winning exhibit compared favourably with any of the bacon shown, and demonstrated that if furnished with the right type of bacon hog, Canadian bacon curers need not fear competition in the British market so far as quality is concerned.

A notable increase is shown in the number of animals of the different dairy breeds recorded in Report No. 15 of the Record of Performance of Pure-Bred Dairy Cattle recently published by the Dominion Live Stock Branch. In the 305-day division, or Honour Roll, Ayrshires show a numerical increase of 74 compared with the previous year's report; Holstein-Friesians an increase of 71, Jerseys of 90, and Shorthorns of 11. In the 365-day division, Jerseys have the largest increase, namely 159, of which 52 are in the mature class and 73 in the two-year-old. A marked increase in registration is that of the Guernseys, which number 64 compared with 24 the year before. The number of animals recorded of the French Canadian breed is 25 compared with 10 the previous year, and of Red Polled, 9 compared with 2.

Changes have been made in the arrangement of the Report whereby information is compiled in a more compact form, the name of the cow, its parentage, owner, breeder, dates of test and calving, times milked daily, total production of milk and fat, percentage days in milk, and R.O.P. number all being given under one entry. The other contents of the Report are requirements of registration, a list of bulls of each breed, qualified for registration since the commencement of the test, with their qualified progeny, and a complete index of the owners, etc.

The Director of the Agricultural School at Olds, Alberta, Mr. F. S. Grisdale, reports a yield of 105 bushels of Marquis wheat from one acre at the demonstration farm connected with the School. The wheat graded No. 1 Northern, and the yield probably constitutes a record for the Province. The same farm secured 105 bushels of oats from a single acre, and from 27 acres of barley, 70 bushels per acre were obtained while another variety of barley averaged 80 bushels for 10 acres.

Interest among poultry breeders in the Record of Performance for Poultry, conducted by the Dominion Live Stock Branch, is increasing each year. From a moderate beginning with 67 breeders entering 4,436 birds in 1919-20, the entries for the season ended November 30, 1923, were 175 breeders and 12,286 birds.

A breeder may enter any number of birds and, in the event of a bird laying 150 eggs in 52 consecutive weeks, is given a Record of Performance certificate to cover that bird's production. If a bird lays 225 eggs in 52 consecutive weeks the breeder is given an advanced certificate. The tests are carried out on the breeder's own plant under systematic inspection by officers of the Dominion Live Stock Branch. As the breeders entered are carrying on pedigreed breeding, the work is likely in course of time to have a beneficial influence on the poultry industry generally.

In several cities of the Dominion, eggs are now being sold on grade on the public market, in accordance with the Regulations respecting the Grading and Marking of Eggs, which became effective in July, 1923, and are administered by the Dominion Live Stock Branch. The regulations in this connection provide that every case or container of eggs exposed, displayed or offered for sale direct to consumers in a public place or manner is to be marked with the name of the class and grade of eggs in the container. In every instance where eggs are being inspected the market authorities have assisted the federal officers and have provided the facilities for grading.

New Zealand, has recently become the largest exporter of both cheese and butter In 1900 Canada's production of cheese was 220,833,269 pounds; in 1922 it was 134,530,053 pounds. In 1903 Canada contributed 68 per cent of the cheese imported by the United Kingdom, and in 1914, 51 per cent. In 1922 Canada supplied 39 per cent while New Zealand supplied 50 per cent compared with 28 per cent in 1914. If Canada would regain for her cheese the place she formerly held in the British Markets it is plain that she must adopt progressive measures such as that inaugurated last year providing for the official grading of factory cheese and butter intended for export. Otherwise our dairymen are likely to discover that their market has slipped away from them.

Up to the end of October, 1923, according to Dominion Live Stock Branch reports, Great Britain had taken from Canada 48,656 cattle compared with 16,346 in the same period last year; 5,210,100 pounds of beef compared with 4,676,400 pounds; 80,598,800 pounds of bacon compared with 78,340,600 pounds; 2,032,700 pounds of pork compared with 155,900 pounds and 29,500 pounds of mutton compared with 34,100 pounds. The United States took 62,878 cattle compared with 141,867; 22,182 calves compared with 21,508; 19,406 sheep compared with 79,543; 10,314,-400 pounds of beef compared with 14,276,-400; 122,800 pounds of bacon compared with 133,600 pounds; 605,300 pounds of pork compared with 448,900 and 1,184,-900 pounds of mutton compared with 4,291,400 pounds.

From the St. Thomas laboratory for the production of the corn borer parasite, *Habrobracon*, some 585,000 specimens were liberated at centres of infestation during the season of 1923, according to the Dominion Entomologist.

During the season 1921-22, Bermuda imported 7,094 barrels of seed potatoes of the Garnet variety from the Province of Nova Scotia. The inspection authorities in Bermuda report that the stock was of good quality and true to type. In the later shipments the filling of the barrels showed an improvement. The Province of New Brunswick supplied an unstated quantity of the Triumph variety, and other stock was reported as good both in shape and colour.

The University of Saskatchewan is building an Animal Research Laboratory, which should prove of great value to the Province in investigating various diseases affecting live stock.

The Province of Ontario made a very creditable showing at the National Dairy Show held at London, England, in October last. The exhibit of butter from the Ontario Department of Agriculture was awarded a gold medal. The first prize for cheese went to a factory in Eastern Ontario. For eggs, first place was secured with an exhibit of graded eggs supplied by the

associated egg circles of Oxford county, while for hens the first prize was won by a beekeeper in Durham county.

Saskatchewan bids fair, in the very near future, to be the leading producer of turkeys in North America. At her present rate she will exceed before long the turkey production of any single province or state.

The success attending the Corn Show held by the Saskatchewan Corn Growers' Association at Maple Creek, Sask., in November last, is an indication of the marked interest in corn growing now taking place in the prairie provinces. The area devoted to the crop was 13,000 acres in 1913, mostly in Southern Manitoba. By 1922 it had increased to 83,000 acres, while in 1923 it increased still further, although figures are not yet available. The extension of the crop will be encouraged by the extent of the development of early maturing varieties having a good grain yield, such as are now making their appearance. All the prairie provinces were represented at the Show.

The following is the student enrolment at the College of Agriculture, University of Alberta, Edmonton, for the current year:—

B.S.A. Degree Course

1st year	24
2nd "	12
3rd "	11

B. Sc. Degree Course

1st year	11
2nd "	2
3rd "	14
4th "	10

Arts and Agriculture

Combined Course	5

Household Economic Course

Degree Course	6
Graduate students	9

This year for the first time the institution is offering a four-year course with matriculation entrance requirement. This course will for the present be known as the B.Sc. course to distinguish it from the three-year course leading to the degree of B.S.A. It will be discontinued as soon as circumstances permit.

At the Pacific North West Potato Show held in Spokane, U.S.A., November 20-23, British Columbia growers captured all prizes in the certified seed miscellaneous class, and made a very creditable showing in all other classes.

APPOINTMENTS AND STAFF CHANGES

G. D. Matthews, B.S.A., (McGill), has been appointed Assistant Superintendent in charge of Cereal and Forage Crop Investigation at the Dominion Experimental Farm, Indian Head, Sask.; Richard Rankin Hurst, Assistant Plant Pathologist, Saskatoon, Sask.; William Gilbert P. Garlick Assistant Entomologist, Vineland, Ont.; and Hugh Moyle Greenwood, Poultry Inspector, Ottawa.

The University of Saskatchewan announces the following appointments to the Faculty: Seymour Hadwin, D.V.S. (McGill), Research Professor of Animal Diseases (new); A. J. G. Maw, B.S.A., (Macdonald), Instructor in Poultry Husbandry (new); Truman Stevenson, B.S.A., Instructor in Field Husbandry; and E. A. Howie, B.S.A., Assistant in Dairying.

Mr. W. W. Fraser, who for the past seven years has been Manitoba's Live Stock Commissioner, recently tendered his resignation to the Provincial Government. It is understood that Jas. R. Bell, formerly District Representative at Portage la Prairie and lately appointed Live Stock Specialist on the Extension Department, will take over Mr. Fraser's duties.

ASSOCIATIONS AND SOCIETIES

Entomological Society of Ontario.—The sixtieth anniversary of the founding of the Entomological Society of Ontario was celebrated by holding a series of meetings in Ottawa, November 1-3, 1923. The regular sessions were held in the Exhibition Room of the Dominion Entomological Branch. About seventy-five attended the meetings, and thirty-five papers were presented. A public address was given by Dr. A. F. Burgess of the United States Bureau of Entomology, on the "Value of Natural Enemies of Injurious Insects". The annual dinner was held at the University Club, Professor Lochhead of Macdonald College being chairman. Dr. Bethune, the oldest living charter member, sent an interesting paper reviewing the early history of the Society. The paper was read by Mr. Arthur Gibson, Dominion Entomologist. President Morris gave a paper on the works of W. H. Hudson, "Nature's Clairvoyant". On the last day of the gathering, European Corn Borer moving pictures were shown, as well as a number of reels on wild life. The Society visited the Parliament Buildings and, after a luncheon, were taken on a motor trip around the city and to view the chrysanthemum show at the Experimental Farm.

Papers were presented by the following members of the Entomological Branch staff: Messrs. Arthur Gibson, H. A. Robertson, A. G. Dustan, C. Howard Curran, Norman Criddle, Arthur Kelsall, W. A. Ross, L. S. McLaine, H. E. Gray, G. H. Hammond, T. Armstrong, H. F. Hudson, A. A. Wood, J. M. Swaine, H. L. Viereck, W. N. Keenan, H. G. Crawford, C. B. Hutchings, J. D. Tothill, and C. R. Twinn.

The following were elected officers of the Society for the year 1924: President, J. M. Swaine; Vice-president, R. C. Treherne; Secretary-Treasurer, A. W. Baker; Editor, *Canadian Entomologist*, J. H. McDunnough.

Ontario Fox Breeders' Association.—Membership in the Ontario Fox Breeders' Association is restricted to breeders who are members of the Canadian Silver Fox Breeders' Association. Foxes on the ranches of these breeders are subject to inspection by inspectors of the Federal Government, and, on passing inspection, are tatooed with the letters and numbers of the owner.

The officers of the new association are as follows: President, E. C. H. Tisdale, Beaverton; Vice-President, W. H. C. Ruthven, Alliston; Secretary-Treasurer, C. K. Walton, Oakville.

Canadian Association of Exhibitions.—As a result of a conference of the representatives of Class A, or principal fairs and exhibitions throughout Canada, held at Ottawa in November, 1923, an organization was inaugurated known as the Canadian Association of Exhibitions.

Provisional officers were elected as follows: President, D. T. Elderkin, Regina, Sask.; Vice-President, J. K. Paisley, Ottawa; Secretary-Treasurer, S. W. Johns, Saskatoon, Sask.

The board of directors will consist of one representative from each member, the membership in the association being open to all Class A exhibitions in Canada, also winter and spring shows receiving federal aid.

Associations not represented at the meeting have the privilege of naming their own directors should they decide to join the new association. The associations represented at the meeting and directors elected were:

Charlottetown, P.E.I., Charles R. Smallwood; St. John, N.B., H. A. Porter; Fredericton, N.B., Mr. Cooper; Quebec, Georges Morrisette; Three Rivers, Dr. J. H. Vigneau; Sherbrooke, Que., S. E. Francis; Ottawa, J. K. Paisley; Toronto, J. G. Kent; Brandon, J. E. Rettie; Regina, D. T. Elderkin; Saskatoon, S. W. Johns; Edmonton, W. J. Stark; Calgary, E. L. Richardson; Vancouver, H. S. Rolston; New Westminster, D. E. MacKenzie; Amherst, N.S., S. A. Logan.

The President, Vice-President, and Secretary-Treasurer, were constituted a committee to dratt a constitution. The first annual meeting will be held in Toronto during, or immediately after, the Royal Winter Fair of 1924.

Prince Edward Island Egg and Poultry Association.—President, John R. Munn, Marshfield; Secretary, Geo. Lightizer, Charlottetown.

Prince Edward Island Swine Growers' Association.—President, Peter Brodie, York; Secretary, W. J. Gibson, Marshfield.

Prince Edward Island Beekeepers' Association.—President, Robt. Moase, Kensington; Vice-President, H. H. Taylor, Charlottetown Experimental Station; Secretary-Treasurer, Harold Newsom, Charlottetown.

Alberta Hereford Breeders' Association.—President, O. A. Boggs, Daysland; Vice-President, John Wilson, Innisfail; Secretary-Treasurer, Thomas Bellew, Calgary.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Report of the Director, E. S. Archibald, B.A., B.S.A., for the year ending March 31, 1923. Dominion Experimental Farms.

Experimental Station, Cap Rouge, Que., 1922.—Report of the Superintendent, G.A. Langelier, D. Sc. A. Dominion Experimental Farms.

Experimental Station, Kentville, N.S., 1922—Report of the Superintendent, W. Saxby Blair. Dominion Experimental Farms.

Experimental Farm, Nappan, N.S., 1922—Report of the Superintendent, W. W. Baird, B.S.A. Dominion Experimental Farms.

Experimental Station, Fredericton, N.B., 1922.—Report of the Superintendent, C.F. Bailey, B.S.A. Dominion Experimental Farms.

Tobacco Division, 1922.—Report of the Officer in Charge, F. Charlan. Dominion Experimental Farms.

Poultry Division, 1922.—Report of the Dominion Poultry Husbandman, F. C. Elford. Dominion Experimental Farms.

Report of the Dominion Entomologist, Arthur Gibson, F.R.S.C., F.E.S.A., for the two years 1919 and 1920.

Dairy Industry Act, 1914, as Amended in 1923.—Administered by the Dairy and Cold Storage Branch. Acts, Orders and Regulations No. 13.

Live Stock Shippers' Guide.—How to Move Commercial and Exhibition Stock, by L. E. Cosby, Transportation Specialist, and P. E. Light, B.S.A., Markets Intelligence Service, Live Stock Branch. Pamphlet No. 38—New Series.

The Origin and Quality of Commercial Live Stock Marketed in Canada, 1920-21-22.—Report No. 3. Markets Intelligence and Stock Yards Service, Live Stock Branch.

The Canadian Record of Performance for Pure-Bred Dairy Cattle.—Regulations, Standards and Records of Cows Qualified for Registration. Report No. 15. Live Stock Branch.

Intact Uterine Live Stock.—Bulletin No. 29—New Series. By S. Hadwen.

Seed, Feed and Fertilizer Markets.—Current Wholesale and Retail Prices and Other Information relating to the Sale of Seed, Feed and Fertilizer in Canada. Statements with regard to markets are based on information supplied by Seed Branch correspondents under special arrangement. Dominion Seed Branch. Issued every two weeks.

Bees and How to Keep Them.—By C. B. Gooderham, B.S.A., Dominion Apiarist. Bulletin No. 33—New Series. (Revised from Bulletin No. 26). Bee Division.

Biological Notes on Parasites of Prairie Cutworms.—By E. H. Strickland. Bulletin No. 26—New Series (Technical).

How Should Canada Export Beef Cattle.—An Experiment in the Shipment of Live Cattle and Chilled Beef to England conducted by the Experimental Farms Branch. Pamphlet No. 39—New Series. Animal Husbandry Division.

The Maple Sugar Industry in Canada.—By J. B. Spencer, Director of Publicity. (Third Edition). Bulletin No. 30—New Series.

The Fertilizer Act, 1922.—With Regulations made by the Minister of Agriculture. Administered by the Seed Branch. Acts, Orders and Regulations No. 9.

The Seeds Act, 1923.—With regulations made by the Minister of Agriculture. Administered by the Seed Branch. Acts, Orders and Regulations, No. 11.

The Feeding Stuffs Act.—With Amendments and Regulations. Administered by the Seed Branch. Acts, Orders and Regulations No. 10.

ONTARIO

Ontario Agricultural College and Experimental Farm, 1922.—Forty-eighth Annual Report.

Fruit Growers' Association of Ontario, 1922.—Fifty-fourth Annual Report.

Live Stock Branch, 1922.—Annual Report. *Twenty-third Annual Report of the Agricultural Societies and of the Convention of the Association of Fairs and Exhibitions, 1923.*

Statistics Branch, 1922.—Annual Report. Part I.—Agricultural Statistics. Part II.—Chattel Mortgages.

Report of the Stallion Enrolment Board of Ontario, 1923.

A Few of the Leading O.A.C. Varieties of Grain Crops.—By Charles A. Zavitz, B.S.A., D.Sc., Professor of Field Husbandry and Director of Plant Breeding and of Field Experiments. Circular No. 42.

Preliminary Soil Survey of Southwestern Ontario.—By Prof. R. Harcourt, W. L. Iveson and C. A. Cline, Department of Chemistry. Ontario Agricultural College. Bulletin No. 298.

Insecticides and Fungicides.—By H. L. Fulmer, B.S.A., M.A., Associate Professor of Chemistry. Bulletin 302. (A revised edition of No. 195). Ontario Agricultural College.

The Brood Sow.—By R. G. Knox, B.S.A., Lecturer in Animal Husbandry, and Wade Toole, B.S.A., M.S., Professor of Animal Husbandry. Ontario Agricultural College. Bulletin No. 301.

QUEBEC

Dairymen's Association of the Province of Quebec, 1922.—Forty-first Report. Supplement to the report of the Honourable Minister of Agriculture.

MANITOBA

Weeds of Manitoba.—Extension Bulletin No. 73. Superseding Extension Bulletin No. 30. By V. W. Jackson, Professor of Botany, Manitoba Agricultural College.

SASKATCHEWAN

Sixteenth Annual Report of the Secretary of Statistics for the Fiscal Year ended April 30, 1923.

ALBERTA

Potato Seed Treatment.—By G. H. Cutler and G. B. Sanford, Department of Field Husbandry, College of Agriculture, University of Alberta. Circular No. 1.

Plows and Plowing.—By J. MacGregor Smith, Department of Agricultural Engineering, College of Agriculture, University of Alberta. Bulletin No. 6.

The Production of Fall Pigs in Alberta.—By J. P. Sackville, Professor of Animal Husbandry and R. D. Sinclair, Assistant Professor of Animal Husbandry. Bulletin No. 7.

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Tomato-growing in British Columbia.—By R. P. Murray, District Field Inspector. Circular No. 65 (New Horticultural Series) Horticultural Branch.

Certified Seed-Potatoes—Why They Will Pay.—By C. Tice, B.S.A., Acting Chief Soil and Crop Instructor and Potato Specialist. Soil and Crop Circular No. 1.

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Canadian Thoroughbred Stud Book.—Volume 2. Compiled and edited in the office of the Canadian National Live Stock Records, Ottawa, and published by the Canadian Thoroughbred Horse Society.

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THE LIBRARY

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The encyclopedia of food, published by Artemas Ward. New York, 1923. 596 p. il. col. plates.

Textbook of agricultural bacteriology, by F. Löhnis, Ph.D. and E. B. Fred, Ph.D. New York. McGraw-Hill book co. inc. 1923. 283 p. il. (Agricultural and biological publications; Charles V. Piper, consulting editor).

Vegetable crops, by Homer C. Thompson, B.Sc. New York, McGraw-Hill book co. inc. 1923. 478 p. il. (Agricultural and biological publications; Charles V. Piper, consulting editor).

British mammals, written and illustrated by A. Thorburn, F.Z.S. London, Longmans, Green & Co., 1921. 2 vols. il. col. plates.

The soybean, by Charles V. Piper, M.S., D.Sc., and William J. Morse, B.S.A. New York, McGraw-Hill book co. inc. 1923. 329 p. il. (Agricultural and biological publications, C.V. Piper, consulting editor).

Miscellaneous papers in agricultural economics, Vol. II, 1919-1922. Oxford, Institute for research in agricultural economics, 1923. v. p.

The rose in America. by J. Horace McFarland. New York, Macmillan co. 1923. 233 p. il.

Farm mortgage financing, by Ivan Wright. New York. McGraw-Hill book co. inc. 1923. 343 p. Bibl. pp. 249-261.

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The nature and properties of soils; a college text of edaphology, by T. Lyttleton Lyon and H. O. Buckman. New York, Macmillan co. 1923. 588 p. il.

Farmer's shop book, by Louis M. Roehl. Milwaukee, Wis. Bruce publishing co. 1923. 429 p. il.

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Evolution, heredity and eugenics, by J. M. Coulter. Bloomington, Ill. J. G. Coulter, publisher, 1916. 134 p. il. (School science series No. 5).

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The phylogenetic method in taxonomy, by Harvey M. Hall and F. E. Clements, Washington, Carnegie Institution of Washington, 1923. 335 p. il. (Publication 326).

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The American live stock and meat industry, by R. Alexander Clemen, M.A. New York, Ronald press co. 1923. 872 p. il.

Animal nutrition, by E. T. Halnan, M.A. London, Benn bros. ltd. 1923. 52 p. il.

Farm meats, by M. D. Helser, B.S.A. Toronto, Macmillan co. of Canada, 1923. 274 p. il.

Economics for commercial students, by Albert Crew. London, Jordan & sons, 1923. 384 p.

Le travailleur agricole francais, par Georges Risler. Paris, Payot et cie, 1923. 281 p.

L'agriculture commercialisee, par Armand Bonat. Paris, Librairie agricole de la maison rustique. 348 p. il.

Economie rurale, par E. Jouzier. Paris, Librairie J. B. Bailliere et fils, 1920. 550 p.

An introduction to statistical methods, by Horace Secrist, Ph.D. Toronto, Macmillan co. of Canada, 1917. 482 p. il.

Practical landscape gardening, by R. B. Cridland. New York, A. T. De La Mare co. inc. 1922. 276 p. il. plans.

Range & pasture management, by A. W. Simpson, M.A. New York. John Wiley & sons, 1923. 421 p. il.

The enemies of the rose, by G. Massie and F. V. Theobald. London, National rose society. 110 p. il.

Fundamentals of educational measurement, by C. A. Gregory, Ph.D. New York, D. Appleton & co. 1923. 382 p.

Eugenics, genetics and the family; eugenics in race and state. Baltimore, Williams & Wilkins co. 1923. 2 vols. (Scientific papers of the International congress of eugenics).

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Smith's college chemistry revised and rewritten, by James Kendall. New York Century co. 1923. 747 p. il.

Chemistry applied to home and community by Pauline Beery, A.M. Philadelphia, J. B. Lippincott co. 1923. 534 p. il.

Farm fertility, by S. B. Haskell. New York, Harper & bros. 1923. 243 p.

From the Greeks to Darwin, by H. F Osborn, Sc.D. Toronto, Macmillan co. of Canada, 1922. 259 p.

Outline of genetics, by M. C. Coulter. Chicago, University of Chicago press, 1923. 211 p.

Notes of a Catholic biologist, by Rev. G. A. Kreidal. St. Louis, B. Herder book co. 1922. 276 p.

The laws of life, by W. M. Goldsmith Ph.D. Boston, R. G. Badger, 1922. 441 p., il.

Student's manual of exercises in elementary biology, by B. C. Gruenberg and F. W. Wheat. New York, Ginn & co. 1923. 162 p. il.

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Zoology, a textbook for universities, colleges and normal schools, by T. W. Galloway, Ph.D. and P. S. Welch, Ph.D. Philadelphia, P. Blakiston's son & co. 1922. 558 p. il.

Animal life and intelligence, by C. Lloyd Morgan. London, E. Arnold, 1890. 512 p. il.

Agricultural organization in the United States, by Edward Wiest. Lexington, Ky. 1923. 618p.

The chemical basis of growth and senescence, by T. B. Robertson. Philadelphia, J. B. Lippincott co. 1923. 395p. (Monographs on experimental biology).

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Home economics for schools, by Agnes K. Hanna. Boston, Whitcomb and Barrows, 1922. 327 p.

Horticulture for schools, by A. V. Stubenrauch, Milo N. Wood and C. J. Booth New York, Macmillan co. 1922. 325 p. il.

Furs and the fur trade, by J. C. Sachs London, Sir Isaac Pitman and sons, ltd. 1923. 128 p. il.

Laboratory outlines for general botany; 5th ed. by John H. Schaffner. Columbus, O. 1922. 130 p. il.

The administration of schools in the cities of the Dominion of Canada, by W. L. Richardson. Toronto, J. M. Dent & Sons, ltd. 1922. 315 p.

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The vegetation of Long Island, Part I. The vegetation of Montauk; a study of grassland and forest, by Norman Taylor. Brooklyn, Brooklyn botanic garden, 1923. 107 p. il. (Memoirs Vol. II).

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The British association for the advancement of science; a retrospect 1831-1921, by O. J. R. Howarth, O.B.E., M.A., secretary. London, 1922. 318 p. il.

Treaties, conventions, international acts, protocols, and agreements between the United States of America and other powers, 1910-1923. Vol. III 1923. Washington, D.C. Government printing office, 1923. 3918 p.

The co-operative marketing of farm products, by O. B. Jesness, B.S.A. Philadelphia, J. B. Lippincott co. 1923. 305 p. il.

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A dictionary of applied physics, ed. by Sir Richard Glazebrook, K.C.B. Toronto, Macmillan co. of Canada, 1922-23. 5 vols.

Handbuch der landwirtschaftlichen pflanzenzuchtung, by C. Fruwirth. Berlin, Paul Parey, 1922-23. 5 vols.

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Animals of the past, by F. A. Lucas. New York. American museum of natural history, 1922. 207 p. il. 6th ed.

Fundamentals of organic and biological chemistry, by T. G. Phillips, Ph.D. New York. D. Appleton & co. 1923. 260 p.

Les comptes a la ferme; comment je tenais mes comptes, par A. Sibille. Paris, Librairie agricole de la maison rustique, 1923. 184 p. il.

Les principales maladies des habitants de la basse-cour, par G. Moussu. Paris, Librairie agricole de la maison rustique. 267 p. il.

The evolution of breeds, by D. F. Malin. Des Moines, Iowa, Wallace publishing co. 1923. 278 p. il.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

THE INSTITUTE'S PUBLICATIONS

The following are the bulletins and the more important of the other publications issued by the International Institute of Agriculture, with subscription prices:

The International Crop Report and Agricultural Statistics.—This bulletin is published monthly on the Thursday nearest the 20th. It contains three parts.

The part devoted to *Production* gives, as it were, a picture of the world-situation as to the areas and the production of the most important agricultural products (cereals, potatoes, vines, sugar, cotton, etc.). The Institute, which receives its information to a large extent telegraphically, furnishes the most recent data compared with the data corresponding for the previous year and with those for the preceding quinquennial period; besides news concerning weather, crop conditions, sowings, harvest prospects, etc. Each number of the said publication will contain detailed statistics on the number of *live stock* existing in the different countries.

The part devoted to *Trade* will comprise a series of tables containing data relative to the imports and exports of the different countries, by seasons and by months for the following products: wheat, wheat flour, rye, barley, oats, maize, rice, linseed, cotton and tea.

By consulting the tables of *Prices* the reader will be able to compare the recent prices of cereals and of cotton on the various markets of the world, with an extensive list of previous prices, thus obtaining a true knowledge of the tendencies of these markets; this comparison will be facilitated also by the index numbers of the various prices which are inserted.

The area and production of crops are now given in the crop report in acres and centals.

Subscribers to the *International Crop Report and Agricultural Statistics* will receive free during the year two summarized statements of the world's cereal requirements and supplies.

The annual subscription price is $3.00.

The *International Review of the Science and Practice of Agriculture* is published quarterly. Each issue will contain about 250 pages.

Part I of the Review will include original articles by recognized authorities dealing with important agricultural problems of world-wide interest. Part II will include technical information obtained from all parts of the world. Part III will consist of notices concerning the outstanding events from the agricultural standpoint such as conferences, exhibitions, shows, etc.

The annual subscription is $3.00.

The *International Review of Agricultural Economics.* is also published quarterly. It will continue to deal with agricultural co-operation, agricultural insurance, credit, the economic and social conditions of the agricultural classes, land systems, etc. An attempt will be made to give greater variety and greater general interest to the articles by having recourse to outside contributors.

Attention might be drawn to the fact that two very valuable articles on Canadian subjects were published in recent numbers of the Review: "Rural Credits in Canada" by Professor W. T. Jackman of Toronto University, and "Co-operation for the Marketing of Agricultural Produce and the Supply of Farm Requisites in Canada," by W. E. H. Lang, of the staff of the Institute Bureau of Economic and Social Intelligence. These two articles have lately been published as separate pamphlets.

The annual subscription for the Review is $2.00.

The subscription price for all three of the above mentioned publications taken together is $6.00.

The twelfth volume of the *International Year Book of Agricultural Legislation* has just been issued. It contains the more important legislation on agriculture enacted in the different countries in 1922. Although published in the French language only

there is a lengthy analytical introduction in English which gives synopses of many of the tables given in detail in the text. The price of the volume is 60 francs.

The *International Year Book of Agricultural Statistics*, 1922. The most complete work of its kind published. It is arranged for both English and French readers. Price, $2.00.

Other Publications

Commerce International du Betail et de ses Derives (Statistical Tables) 136 pages, 8 francs.

Produits Oleagineux et Huiles Vegetales (a statistical study of their production and trade) 443 pages, 20 francs.

The Landschaften and Their Mortgage Credit Operations in Germany, 90 pages, 3 francs.

Profit Sharing in Agriculture in Great Britain and Ireland, 24 pages, 1 franc.

The Present Organization of the Services for the Control of Plant Diseases in the Different Countries, 25 cents.

How to Subscribe

Anyone wishing to subscribe to any of the Institute's bulletins or other publications should have a post office order made out payable to the International Institute of Agriculture, Rome, Italy, and either forward it direct to the Institute or through this office. The prices quoted above in all cases include packing and postage charges.

MOVEMENT TO IMPROVE, EXTEND AND POPULARIZE THE ENGLISH EDITIONS—STRONG SUPPORT OF THE INSTITUTE BY OTHER CONSPICUOUS INTERNATIONAL BODIES

The American delegation of eleven members, who attended the last General Assembly meetings of the Institute in May, 1922, moved that English be made the official language of the Institute as well as French in all its proceedings and publications. The principle was accepted in that the English and French languages were adopted for the discussions, resolutions and orders of the day of the General Assembly. A summary of these speeches was repeated in French or English by an authorized interpreter. As for editions of the different publications in languages other than the French the extra expense involved was to be defrayed by each group of countries interested by both direct Government contributions and private subscriptions. This is practically the policy being followed. Great Britain, the self-governing Dominions and the United States have been paying special contributions for the translations into English and, in so far as the Government contributions and the private subscriptions meet the requisite additional expenditure, the Institute's policy is further to extend publication in English to publications other than the three monthly periodicals.

Now that the scientific and practical value of the publications is universally recognized the Institute was confident that the number of private subscriptions would continue to multiply even more rapidly than they had done during the preceding year.

The Commissioner of this Branch has just received from the delegate of the United States on the Permanent Committee, Mr. Asher Hobson, a letter in which the latter states that one of the questions to be submitted by the United States Government for consideration at the next General Assembly is the following:—

> "The United States recommends that American equivalents of weights and measures (acres and bushels) be used in the publications of the Institute that are to be distributed in the United States and Canada."

It is not improbable that all the English speaking countries will support this resolution and that it will be adopted. This is the culmination of the initiative taken by the Commissioner of this Branch before and at the General Assembly of 1920 and since repeatedly urged upon the attention of the Canadian delegate on the Permanent Committee, Sir Thomas Elliott. The latter made a ready response and has already successfully used his influence with the Institute, in co-operation with the United States delegate, to the extent that the Bulletin of Agricultural Statistics now does use acres instead of hectares, and, in many cases, bushels instead of quintals, as well as dollars instead of francs. The United States' proposal is to make the use of the acre and bushel general in the Statistical Bulletin, the Statistical Year Book and other publications.

In proportion to the Government contributions to the League of Nations (some three or four million dollars) for the representation of some fifty countries, the paltry $175,000 at present being annually spent at the Institute for the representation of over sixty countries is quite insignificant and out of all proportion to the importance of the interests concerned. Hence this appeal to the friends

of this unversal agricultural league to subscribe to its publications. These are in their particular class really the most valuable agricultural periodicals published, either for scientific or for practical purposes.

In connection with this appeal it is recalled that the International Council of Agriculture held at Paris in May 1923 passed the following resolution concerning the International Institute of Agriculture: "Recognizing the services already rendered by this Institute the Governments ought to study the means by which its efficiency can be increased in order that agriculturists may in their turn derive the fullest benefit from its work."

This statement discloses an attitude similar to that of the Economic Council of the Great Powers at Geneva in 1922 which, in Article 20 of its resolutions, states: "It is equally desirable that the States give particular attention to the activities of the International Institute of Agriculture."

This common attitude of the highest international bodies in the world will without doubt rally to the Institute's support not only the Dominion and Provincial Governments of Canada, but also officers of agricultural bodies and individual agricultural readers, who may show their active interest by deriving the benefit accruing from keeping in touch with practically everything of importance going on in the outside agricultural world. If the League of Nations is worthy of the support of all Governments and the people behind them surely the International Institute of Agriculture, the harbinger of the Universal Peace Movement, through its founder, David Lubin, should consistently receive equally generous aid.

SCIENCE AND PRACTICE OF AGRICULTURE

AGRONOMY

332.—The Practical Measurement of Soil Acidity.—Hissink, D. J., Dr., *De Veldbode*, No. 1066, pp. 475-476. Maastricht, June, 1923.

The author, who is the director of the Experiment Station of Groningen (Holland), has so far distributed to agriculturists 250 "Comber" instruments for measuring soil acidity. The figures obtained with this instrument are not absolutely accurate, but serve for practical purposes, indeed, the measurements made by agriculturists and tested by the author in his laboratory have in several cases proved to be quite exact.

The object of the author in thus distributing the "Comber" apparatus was to obtain a large amount of statistical material. He wished to learn the differences in the reaction of the soil of the same plot according as to whether the plants were growing vigorously or less strongly, since this would show the correlation existing between the degree of soil acidity and crop growth, as well as the amount of acidity required in the case of a given type of soil in order to insure the maximum development of any particular cultivated crop. It is also necessary in this connection, to take into account the situation of the fields, the fertilizer used, and the drainage.

The author gives an answer to the question put by many agriculturists who wished to know whether it was possible to determine by the Comber apparatus the amount of lime required for neutralizing acid soils. The quantity of lime to be applied to acid soils depends, not only upon the degree of their acidity, but is also influenced by the amount of clay and humic substances present. In order to obtain accurate data, the author advises that the soil samples should be analysed in the laboratory.

The Comber method has however, the advantage of enabling the agriculturist to know how many samples should be sent to the laboratory, which allows of the number being reduced and saves expenses.

The author advises the regular testing of soil reaction, even after neutralization, for it is always possible that some of the lime, or of the chemical fertilizers, may have been removed by water, or that their action may only be evident after several years.

By means of the Comber method the agriculturist will always be able to decide for himself whether sulphate of ammonia is better for the soil than nitrate of soda and whether superphosphates or basic slag is the most suitable fertilizer in any given case.

The Comber method is described by the author in the *Journal of Agricultural Science* 1920, p. 420. About 5 cc. of a colourless solution of 40 gm. of sulphocyanide of potassium in a litre of 95 per cent alcohol are introduced into a test tube containing 2·3 gm. of soil. The test-tube is then corked and well shaken several times. As soon as the material in suspension has been deposited, the acidity is determined from the colour of the liquid.

Reaction	pH	Colour
Very acid	4–5	Dark red.
Acid	about 5	Red.
Slightly acid	5–6	Light-red.
Very slightly acid	6–6–5	Pale pink, or colourless.
Traces of acid	6–5–7	
Neutral	7	Always colourless.
Alkaline	above 7–6–5	

If the liquid remains colourless, some chloride of iron is added to colour the solution which is left for 18-24 hours and again shaken. If all the red colouration has disappeared, the soil will be about neutral (pH = 7); if, however, the red tint is still clearly visible, the reaction will be slightly acid. In order to estimate the alkalinity, a series of solutions coloured with increasing amounts of chloride of iron are prepared. The more alkaline the soil, the more iron chloride it is able to absorb.

335.—A Study of Certain Preservatives and their Effect on the Fertilizing Value of Manure.—COLLISON, R. C. and CONN, H. J., *Bulletin No.* 494, pp. 28-74, Geneva, N.Y., 1922.

The value of manure produced on the farm has increased to such an extent that every precaution should be taken to conserve the contained plant food material. The authors have carried out a large number of experiments in order to study the practical methods of treating manure so as to retain the plant food constituents. In the past, both mechanical and chemical methods have been recommended such as storing under cover and trampling down, or the addition of other materials, with a view to the prevention of loss of nitrogen caused by fermentation in the manure heap, or by leaching. Mechanical methods often necessitate extra labour and under ordinary conditions of farming it is usual to store manure for several months, hence, preservation by means of chemical agents assumes importance. An ideal chemical substance should prevent undesirable fermentative changes, but should not check the changes which break down the manurial compounds and make them available as plant food. If in addition, the added substance has a fertilizing value of its own, it is an advantage, provided that the cost is not too great. The authors experimented with the following materials: straw, peat, a clay-loam-soil, acid phosphate, rock phosphate and gypsum, and investigations were carried out with these materials under both laboratory and greenhouse conditions.

Allusion is made to the work of SEVERIN and of RUSSELL and RICHARDS and to the fact that the latter investigators found that the nitrogen losses were due to the volatilization of elementary nitrogen, rather than to that of ammonia. SEVERIN isolated organisms from manure and used them to inoculate sterilized manure. The authors searched particularly for the organism concerned chiefly with the volatilization of ammonia and succeeded in isolating an organism *Bacterium parvulum* which reduced nitrate to nitrite and causes the evolution of large quantities of ammonia from manure. The laboratory experiments showed that loss of ammonia from manure may be prevented by the use of acid phosphate, peat or gypsum; for instance the sterilized check lost only 3 mg. nitrogen as ammonia; the unsterilized manure gave off 247 mg.; when gypsum was added only 44.5 mg. were given off and with peat only 10 mg. or very slightly more than the sterilized check. In this experiment no attention was paid to the loss of free nitrogen. It was shown that preservatives have an effect upon the kinds of micro-organisms present and may suppress those which cause ammonia volatilization. The results obtained when straw was added to manure were interesting, as they suggest that nitrification may take place in manure.

Laboratory tests in themselves are insufficient, as the real test of a preservative is its ultimate effect on the fertilizing effect of the manure, and for this reason compost experiments in the greenhouse were carried out.

For the greenhouse work manure was mixed with the preservatives and kept in a fairly moist condition under cover for three months or more. The composts were then used as sources of nitrogen for crops grown in sand cultures and in the greenhouse, other food elements being supplied by the addition of a mineral nutrient solution. The plants were harvested when the various cultures had reached about the same degree of maturity.

The data relative to these cultures are given below:—

DRY WEIGHT OF TOPS AND COMPARATIVE TILLERING IN BARLEY CULTURES IN COMPOST EXPERIMENT NO. 1. CULTURE SERIES NO. 1

Source of Nitrogen	Culture number	Number of heads	Dry weight of tops
			grams
Rotted manure	1	10	5·0
Rotted manure + $NaNO_3$	2	26	60·5
Fresh manure	3	12	30·0
Fesh manure + $NaNO_3$	4	33	61·0
Gypsum compost	5	12	8·5
Gypsum compost + $NaNO_3$	6	22	58·5
Rotted manure + gypsum	7	11	5·5
Rotted manure + gypsum + $NaNO_3$	8	25	63·5
Acid phosphate compost	9	9	10·5
Acid phosphate compost + $NaNO_3$	10	27	64·5
Rotted manure + acid phosphate	11	10	10·5
Rotted manure + acid phosphate + $NaNO_3$	12	29	64·0
Rock phosphate compost	13	11	7·5
Rock phosphate compost + $NaNO_3$	14	26	61·0
Rotted manure + rock phosphate	15	11	6·0
Rotted manure + rock phosphate + $NaNO_3$	16	28	59·0
Peat compost	17	12	16·0
Peat compost + $NaNO_3$	18	34	69·5
Rotted manure + peat	19	11	8·5
Rotted manure + peat + $NaNO_3$	20	27	69·5
Straw compost	21	12	9·5
Straw compost + $NaNO_3$	22	33	62·5
Rotted manure + straw	23	8	2·5
Rotted manure + straw + $NaNO_3$	24	32	64·0
Soil compost	25	11	11·0
Soil compost + $NaNO_3$	26	19	36·5
Rotted manure + soil	27	12	7·0
Rotted manure + soil + $NaNO_3$	28	24	52·5

A second series of cultures were carried out in soil instead of sand, and a third series with composts, but containing four times the amount of compost used in Series 1 and 2.

Fresh manure gave a higher yield of barley dry tops than rotted manure or any compost, although the peat compost compared favourably. The addition of straw depressed the yield in every case except that of the manure-acid-phosphate-straw compost. When added to rotted manure the depression was 91 per cent and it reached 58 per cent in the manure-peat compost; further experiments are being made on this problem. In the vegetative experiments, acid phosphate compost gave the greatest weight of tops. Acid phosphate and peat both helped to retain inorganic nitrogen and apparently left the organic nitrogen in a condition more available to plants. The loss of dry matter on composts kept for four months ranged from 25 per cent on manure treated with acid phosphate to 63 per cent in untreated manure. Peat also was very efficient. Neither rock phosphate nor gypsum were satisfactory preservatives. The results of these experiments show that both acid phosphate and peat may be recommended as preservatives of manure. The former involves less labour, but peat has the additional advantage that it is an excellent absorptive of the liquid portion of the manure and in consequence acts both as a litter and a preservative.

168.—The Importance of Magnesium as a Fertilizer.—I. POPP, PROF. M. and COUTZEN, Dr. J., Die Bedeutung einer Magnesiadüngung fur unsere Kukturpflanzen.—*Landwirtschaftliche Jahrbucher*, Vol. 58, No. 3, pp. 313-355. Berlin, March, 1923. II.—GARNER, W. W., MACMURTREY, J. E., BACON, C. W., and MOSS, E. G., Sand Drown, a Chlorosis of Tobacco due to Magnesium Deficiency and the Relation of Sulphates and Chlorides of Potassium to the Disease.—*Journal* of Agricultural Research, Vol. XXIII, No. 1, pp. 27-41, bibliography. Washington, 1923.

Volcanic soils are mainly composed of silico-magnesian compounds. Magnesium is absolutely necessary to plants, for chlorophyll is an organic compound containing 2.7 per cent of magnesium (WILLS-TATTER, Untersuchungen uber Chlorophyll. Berlin, 1913).

The author made some manurial experiments with magnesium from which he has drawn the following conclusions:

The application of magnesium salts in addition to different potassic salts, or of commercial postassic salts containing a certain amount of magnesium, does not materially increase the yield of different crops, although some good results have been obtained, but there were many cases of failure. Since the physiological reaction of the fertilizers is an important factor in crop yield, soil reaction must be taken into account as well as the reaction of the fertilizer. The potassic content of a plant depends upon the potassic fertilizer, but it is not,

however, possible to tell from the amount of potash present in the plant whether enough potassic fertilizer has been applied. Indeed, it sometimes happens that a crop which has failed owing to lack of potash in the fertilizer has a higher potash percentage than a crop dressed with a potassic fertilizer. This is especially true in the case of grass, but may also occur in that of straw.

The magnesium content of crops has often been inaccurately determined; thus, for instance, STUTZERS well-known tables (in Mentzel's calendar) require revision. The amount of magnesium present in plants is little affected by a potassic fertilizer. The application of physiologically acid or alkaline magnesium salts has practically no effect on the magnesium content of the crop. Various plants use the magnesium of the soil to a different extent. Rye-grass assimilates most, then potatoes and tomatoes, and last of all rye, which assimilates very little of this element.

The solubility of the magnesian salts of mineral soils in a solution of ammonium chloride cannot be taken as any criterion of their assimilability by plants for the values obtained from the solution are far too high. The potash of the soil is probably taken up at the same time as the magnesium but larger amounts of the potash are utilized. The application of physiologically acid potassic salts has little effect upon the utilization of the soil magnesium; but physiologically alkaline salts may decrease it. Dressing with magnesian salts only influences the utilization of potassic salts in cases where physiological reaction comes into play. No direct action of the magnesium has yet been found. Salts of magnesium when added to a fertilizer are very little used by plants; the sole exception to this rule is in the case of the tomato, which bears a large number of leaves and absorbs considerable quantities of these compounds. The potato, on the other hand, utilizes a magnesium fertilizer to a very limited extent and therefore derives no benefit from it. The magnesium present in commercial potassic salts is not used differently. Neither the potato, nor any other plant, shows a preference for any special potassium salts.

Since the amount of magnesium present in the soil is certainly sufficient for the crops grown, the application of magnesium salts seems superfluous.

The results of the author's experiments do not always agree with practical experience. Thus for instance, the beneficial effect on potatoes of the double sulphate of potassium and magnesium cannot be denied. It may, however, be supposed that the physiological reaction is of prime importance in this case. The problem can however be solved only by means of field experiments.

H. Magnesium appears to be of great importance in tobacco-growing.

Chloride of potassium tends to influence the burning properties of tobacco and sometimes produces an undesirable colour, therefore it is well to use sulphate of potassium in conjunction with sulphate of magnesium. Experience has proved that potassic salts such as kainit and other containing more or less magnesium, give better results than the pure sulphate. Very pure potassic salts ought not to be used for dressing tobacco. A total absence of magnesium produces tobacco chlorosis (sand drown). This disease can be cured, and even prevented, by adding small quantities of magnesium to the fertilizers employed. How far the experimental results obtained in the case of tobacco disease due to lack of magnesium can be applied to other crops is a matter still requiring study.

29.—Effect of Cupric Treatments on the Wheat Yield.—MORETTINI, A., *Le Stazioni sperimentali agrarie italiane*, Vol. LV, Pts. 7-8-9, pp. 265-277. Modena, 1922.

In a preceding article (*Stazioni sperimentali agrarie italiane*, (1921) the author has shown the advantage of substituting "polvere Caffaro" (oxychloride of copper), or powdered copper carbonate for the usual treatment with a solution of copper sulphate in the control of Smut (*Tilletia Tritici*). Experiments have proved that the dry treatment prevents smut without in any way injuring the germinating capacity of wheat. It has also been shown that germination after immersion in a 0.5 to 1.5 per cent solution of copper sulphate is not affected. This fact is confirmed by other investigators (KRAUSS, WOLLNY, KIDD and WEST); others consider it has an injurious effect (DARNELL-SMITH and ROSS; MACKIE and BRIGGS), and others again maintain that it is actually beneficial (HARRY).

Results in agreement with the author have been obtained by G. D'IPPOLITO (Riforma agraria) No. 6, 1920; (*Stazioni sperimentali agrarie italiane*, p. 293, 1921).

In the present case, the author proposed to investigate the effect of the two methods of treatment (with solution or with powder) upon the productivity of wheat, without any reference to their resistance to disease.

Three varieties, one an autumn wheat (Gentil rosso semiaristato 48), two spring wheats (one soft "marzuolo ferrarese", one hard "timilia di Sicilia") were each divided into five lots treated respectively as follows: (1) control; (2) immersed in water for 17 minutes, then allowed to dry in the air; (3) immersed in a 0.5 per cent solution of copper sulphate for 15 minutes, then for two minutes in milk of lime and allowed to dry; (4) mixed dry with 3‰ by weight of Caffaro powder; (5) mixed dry with 3‰ of copper carbonate.

The seed was sown 12 days after treatment. The growth was somewhat hindered by the dry spring.

The three series of results agree in showing a higher yield for the seed treated with powder as compared with untreated seed, or with water, or with a solution of copper sulphate. Of the fungicides employed, the copper carbonate gave the best results.

By means of germination tests made with seed subjected to different treatments, the author has ascertained that the increased yield following the dry treatment is due to an increase in the germination capacity. The difference between the germination capacity of the control seed and of that of the seed treated by dry process was, on an average, 2 to 3 per cent with copper carbonate and 2 per cent for "polvere Caffaro".

The increased yield in both cases appears to be due chiefly to the toxic action of the two copper compounds upon the moulds and bacteria that attack the germinating cariopsis and these compounds have no injurious effect on the embryo. This allows the grain to develop a higher germinative capacity; it is possible also that the copper may exercise a stimulative effect upon the growth of the seedling.

In conclusion the author recommends the use of powder fungicides rather than solution.

378.—Behaviour of Hubam Clover in Ohio.—WILLARD, C. J., *The Breeders Gazette*, Volume LXXXIII, No. 15, pp. 505-506. Chicago, April, 1923.

Results of two years observations, made with Hubam clover compared with sweet white biennial clover are summarized as follows:

Hubam in favourable seasons will give a larger yield of hay, following cereals, than any other clover. The yield was 3,930 lb. per acre following early oats, compared with 2,570 pounds of the biennial. As regards total growth, the biennial has proved superior: 240 pounds roots, and 2,730 pounds tops (Hubam) and 1,480 pounds roots and 2,090 pounds tops (biennial). As a soil improving crop, Hubam is therefore not recommended except where an annual crop is required. The nitrogen content of both roots and tops also compared unfavourably with the biennial. The weed problem is also a difficulty, but the value of Hubam clover in many situations where more expensive seed is impracticable, should not be overlooked. The value as a honey producer and the fact that it is possible to have a continuous production of bloom from late in May until after frost, by relying on biennial sweet clovers, and on Hubam is worth consideration.

Superior root yields have been reported in Iowa and indicate that under certain conditions, Hubam roots are equal in value to biennials.

207.—Winter Pruning Experiments with Apple Trees in England.—GRUBB, N. H., in the *Journal of the Royal Horticultural Society*, Vol. XLVII, Pts. 2 and 3, pp. 139-162, London, 1922.

An extensive series of experiments on the winter pruning of apple trees has been made at the East Malling Research Station, England, covering a period of nine years (1913-1922). The methods chosen for investigation were:

(1) unpruned; only diseased and broken wood removed;

(2) open centre; centre of tree kept more or less bowl shaped, no spurring otherwise;

(3) tipped and spurred; leaders tipped (strong growers one third; medium growers one half; weak growers two-thirds); and all laterals not needed to form branches, spurred to three prominent buds;

(4) tipped and short-spurred; laterals spurred to one prominent bud.

I. *Effect of tipping and spurring.*—Tipping appears always to delay or reduce blossoming at least until the biennial bearing habit reduces the number of blossom buds on untipped trees. The table showing the average number of buds per tree, unpruned and pruned gives ample evidence of this fact. The reverse is, however, the case as regards setting; in this case pruning has obviously an indirect influence on the number of mature fruits. The average of all the varieties under observations in 1921 showed that the proportion that set on pruned trees may be estimated as double that on unpruned.

Effect on Cropping.—Except in the case of two varieties, tipping has delayed cropping. In these two cases ("Newton Wonder" and "Beauty of Bath") the trees were tipped one-third. The value of long-spur pruned trees has been proved; in every case on an average of 3 years crops, the total weight of fruits has exceeded that from unpruned trees (about 30 per cent).

Effect on biennial bearing.—Tipping appears to check this habit, but a modification in pruning methods is required to reduce the amount of blossom during the full-bearing year as it seems that profuse blossoming has more influence than heavy fruiting in encouraging the alternate bearing habit. It is suggested that if trees could be hard pruned and the spurs drastically shortened in the winter following their "off" year, and merely thinned out or lightly pruned the alternate winter, cropping should in time become more uniform.

Effect on growth and ultimate size of the tree.—The tipped trees of several varieties show an increase in size of head, more rapidly than unpruned trees, but no general rule can yet be laid down.

Effect on susceptibility to certain diseases.—Tipped trees are much less affected by scab

(black spot), apple mildew, and common canker than unpruned trees. It remains yet to be seen whether this power of resistance should be attributed to a thicker cuticle or differences in structure of the tissues.

Effect of "Open centre" pruning.—The effects are similar to those of tipping but much less marked. The setting of the blossom appears to be more complete than on unpruned trees; the fruit is larger and slightly freer from scab but the cropping varies according to variety. It is interesting to note that the stock seems to considerably influence the total number of fruits. The difference between the open centre and unpruned trees as regards resistance to disease is at present only very slightly in favour of the open centre.

Effect of short-spur pruning.—This always tends to reduce blossoming at least up to the eighth year. In several cases however, setting has been more complete than on long-spur pruned trees and in a few cases has produced a larger total number of fruits. With some varieties (e.g. Cox's Orange and Lanes Prince Albert), the laterals die when short-spur pruned, leaving the wood bare. The Worcester Pearmain and James Grieve, are less seriously affected and Lord Derby and Gladstone show no trace of this effect.

Natural habit in relation to pruning.—It is essential to adapt methods of pruning to the habit of growth and fruiting of each variety; failure to do this often results in long-delayed cropping and heavy loss.

Apart from the erectness, such habits as stoutness of branches, spur formation and number of laterals formed have an equally important bearing on pruning methods.

In conclusion, the importance of studying the differences in the habit of varieties is emphasised, making allowances when pruning for differences in growth and other details.

379.—**Sunflower Silage.**—Amos, A., and Woodman, H. E., *The Journal of Agricultural Research*, Vol. XIII, Part 2, pp. 163-168. London, April, 1923.

An account of trials with "Giant Ensilage", sunflower variety, grown for storage in the silo. This crop, planted on light gravel soil gave a yield of twenty tons of green matter per acre, containing 18.5 per cent dry matter, which compared favourably with the maize crop grown simultaneously (14 tons per acre).

After storage in the silo for three months the silage was examined and appeared to be of good quality, after removal of the top layer of waste material. An outstanding feature of the results was the extremely low percentage loss of dry matter which occurred, namely 4.8 per cent, appreciably lower than any of the corresponding figures obtained in the ensilage trials with oats and tares. The crude protein underwent very little change, but the digestibility value was somewhat lowered. Full data is given with reference to the composition and changes in content of dry matter of green sunflower and sunflower silage.

Trials made in the United States have already demonstrated its value as a stock feed and as a substitute for maize silage. An experiment to test the palatibility of this fodder was made at Cambridge. The authors consider, however, that further investigations as to digestibility and value as a cattle feed, and improved methods of cultivation in order to reduce the fibrous nature of the stems, are necessary before sunflower silage can be recommended on a large scale for feeding stock.

395.—Percival, Prof. J. Seed mixtures for permanent Grassland. *Journal of the Ministry of Agriculture*, Vol. XXX, No. 3, pp. 204-209. London, 1923.

Comparison between the chief methods commonly employed for the production of permanent grass on arable soils: (1) tumble down pastures (random herbage); (2) sowing of hay seeds (from barns and haystacks, etc.); (3) use of seed mixtures of commercial grass and clover seeds. The advantages of a complex mixture are discussed and a list of useful mixtures on light, medium and heavy soils is given including details as to preparation of the land and sowing.

LIVE STOCK AND BREEDING

248.—**Karakul Sheep Breeding in the United States.**—Young, C. C., Practical tests in Karakul sheep breeding. *The Journal of Heredity*, Vol. XIII, No. 5, pp. 228-236, Washington, 1922.

The Karakul sheep can raise its head to the same level as a cow, and is thus able to reach the fruit of many kinds of shrubs and weeds. It has very strong teeth and the mucous membrane of the mouth is very rough.

A test made for a period of several months at El Paso (Texas) shows that the Karakul sheep fattens as rapidly on a poor, dry pasture as a merino fed on lucerne and maize.

On March 20, 1920, four rams were tested on behalf of the United States Bureau of Forestry, being allowed to feed naturally by nibbling the bark of oak trees, willows, "manzanitos", etc. and browsing on poor grass. On May 11, 1920 the rams were shorn and weighed, and weighed a second time at the end of August with the following results:—

—	May 11, 1920		August 31, 1920	
	Weight of fleece	Weight of shorn ram	Weight of ram	Gain
	lb.	lb.	lb.	lb.
No. 1.....	10	147	213	66
No. 2.....	8	141	178	37
No. 3.....	10·5	130	172	42
No. 4.....	11	101	141	40

The fleece shorn on May 11, 1920 was 6 months old and the wool contained no grease and did not require washing, which in the case of the merino causes the wool to lose 50 per cent of its weight.

The flesh of the Karakul has a different flavour from that usually characteristic of sheep and resembles venison. In Central Asia the fat takes the place of butter and is used for cooking purposes.

Crossing a thick fleeced domestic ewe with a good type of Karakul ram often produces lambs whose fleeces are as valuable as those coming from pure-bred sheep. The writer has ascertained that in practice such crossing gives about 100 per cent of black and very early fleeced lambs. The ewes that are more suitable for crossing belong to the following breeds: "Najoo", black headed "Highlands", "Hairy Mexican Corrientes", "Cotswolds", "Lincolns" and "Ahuris".

Since pure-bred specimens are now rare and those only which have never been crossed with a fine wool stock and are of sufficiently pure Danador origin can reproduce lambs with glossy, black and curly fleeces, the writer is of opinion that those only should be considered as pure-bred whose offspring have actually given proof of such purity.

The author considers that the breeding of Karakul sheep can only be expected to be successful if exchanges are made of the comparatively few bred rams and the fine wool specimens are eliminated. He also calls attention to the publication in November, 1922, of a monthly review "*The Karakul Breeder*" specially devoted to this subject

402.—The Value and Use of Certain Stock Feeds.—I. Kling, H. *Wein und Rebe*, Year, 4, Part, 7, pp. 311-326. Mainz, 1922.

II. Fish meal as a food for livestock *Ministry of Agriculture and Fisheries*, Leaflet, No. 333 (Revised, November, 1922). London.

III. Pfeiffer Th.—*Fuhlings Landwirtschaftliche Zeitung*, Year 71, Parts 17-18, pp. 313-324. Stuttgart, 1922.

IV. Richarsen and Brinkmann, *Ibidem*, pp. 325-334.

V. Engels. *Suddeutsche Landwirstchaftliche Tierzucht*, Year 17, No. 25, pp. 299-303. Hanover, 1922.

VI. Fraps, G. S. Digestibility of the Sugars, Starches, Pentosans and Protein of some feeding stuffs. *Ibidem*, No. 290, 21 pp. 1922.

VII. Fraps, G. S. Digestion Experiments. *Ibidem*, No. 291, 11 pp. 1922.

VIII. Wheeler, G. B., The Marketing of Mill Feeds. *Ibidem*, No. 1124, 1922.

Nos. II and VIII are reprinted as follows:—

II.—*Experiments carried out in Great Britain in order to determine the value of fish meal as a food for live-stock.*—The annual production of fish-meal in Great Britain exceeds the internal consumption. Most of this meal used to be given to poultry, but of recent years, it has been increasingly fed to other domestic animals.

The general average of nine recent analyses has given the following minimum, maximum and mean percentages: moisture, 7·7 to 18·1; 12·9; albuminoids (proteins): 51·1 to 63·1; 56·6;—fat 1·3 to 6·7: 3·71 mineral constituents 20·8 to 28·0; 24·9 (these figures include: calcium phosphate 16·6 to 20·6; mean 18·8—salt 0·6 to 5·3; mean 2·2) carbo-hydrates, crude fibre, etc., 0·3 to 4·2; mean 1·9.

As a general rule, fish-meal should only form one eighth of the ration, and when employed as a stock feed, ought to contain no herring, debris or salt. If these precautions are observed, the meat of pigs given fish meal is of excellent quality, but if this care is not taken, the pork acquires an unpleasant smell.

No detrimental affect on the appearance, odour, colour and culinary value was observed in the case of the meat of the pigs used in experiments at Leeds University, where fish-meal formed 1/9 to 1/7 of the total dry food, being fed during the last month at the rate of over 0·5 kg. per head and per day.

In the pig-feeding experiments conducted at the Rowett Research Institute of Bucksburn, Aberdeen, tests were made with:

(1) Fish-meal especially prepared for a stock-feed from fresh salmon waste (analysis: albuminoids 61·1; fat 2·3; inorganic matter, 25·0; moisture 10·3; undetermined 1·3 per cent).

Results.—No disagreeable smell, or taste, was imparted to the fresh, or salted meat, even when the pigs had been fed the meal up to the time of killing.

(2) Fish-meal made of a mixture of salmon and herring waste (analysis: abuminoids 62·2; fat 6·4; inorganic natter 13·6; moisture, 14·6; undetermined, 3·2 per cent). Proportion fed 1/7 of the ration.

Results.—The meat of these animals had a disagreeable smell and taste.

(3) Various commercial fish-meals sold under the name of "White Fish Meal"; amount fed 1/8 of the ration.

flavour no unpleasant odour or smell was imparted to the fresh meat, even when the pigs were fed this meal up to the time of killing. The salted meat, however, had an unpleasant flavour in the case of animals that had received fish-meal up to less than 14 days before they were killed. If the fish-meal had been discontinued for 14 or more days before the animals were killed, their meat was not affected. It may therefore be concluded that meal made from salmon refuse may be fed up to the time of killing in the case of animals of which the meat is to be consumed fresh, and up to three or four weeks before the time of killing, if the meat is intended for salting.

Fish-meal 1 and 2 were given to dairy cows (0·9 kg. per head and per day for two months), and also to hens: the milk from the cows, and the flesh and eggs of the fowls were not affected in any way.

The fish-meal manufacturers of Great Britain have agreed to produce a meal made only from salmon refuse to be sold under the name of "White Fish Meal" and having the following composition: albuminoids not below 55 per cent; calcium phosphate not below 16 per cent fat not above 5 per cent, salt not above 4 per cent.

In three experiments made in 1918-1920 at the West of Scotland Agricultural College, fish meal of the above given type was used for fattening cattle at the rate of 600 gm. per head and per day mixed with rolled oats. The animals fattened well and their beef was excellent. Up to 1·4 kg. of fish meal per head and per day, may safely be fed to milch cows, but care must be taken that the milker does not touch the meal just before milking, otherwise the milk acquires a disagreeable smell.

Owing to its high albuminoid and phosphate content, fish meal is especially good for calves. Recent experiments have proved the advantage of rearing calves on whey and a mixture of fish meal and meal, or milling offals; one part of fish meal and two parts oat meal or middlings being given, for instance. In some trials made at Reading, the following mixtures were given at the rate of 500 gm. per 5 litres of whey: linseed cake + bean flour + fish meal (3:3:1); (2) linseed cake + fish meal (2:1); (3) linseed cake + oat chaff + fish meal (3:2:1).

Horses may be given up to 0·9 kg. fish meal per head and per day; fish meal is especially useful when good hay is lacking and much straw has to be introduced into the ration.

Fish meal also forms a very supplementary food for sheep on roots, and can be given to them at the rate of 150 to 200 gm. per head per day, and per 100 kg. of live weight. It is well suited to suckling ewes.

Chicks must not be fed fish meal until they are at least a week old, when this meal may form 5 per cent of the mash, the amount being afterwards increased gradually. Young fowls, can be fed the following ration: crushed oats + chaff + maize flour + fish meal (8 : 8 : 2 : 1). Laying hens may be given 10 to 15 per cent of fish meal in their mash which may be composed, for instance, of middlings maize flour + chopped lucerne or clover, hay + fish meal (3 : 3: 3 : 1).

VIII. *The marketing of mill feeds.*—The author, Investigator in Feed Marketing, Bureau of Agricultural Economics, Office of Rural Economy of the Department of Agriculture of the United States, examines the organization (from the mills to the purchasers) of the complicated trade of the by-products of milling in the United States, whether this organization is the work of dealers or of wholesale, or retail, buyers or of purchasing co-operatives. He treats of the commercial laws regulating this trade, the grades of the various feeds, the method of studying the condition of the market and of ascertaining the quoted prices, the laws governing this trade in the United States and the present needs of the trade.

Purchasing co-operatives, when first started, preferred to buy their goods as soon as they arrived, viz. after they had been inspected, rather than from the millers who insisted upon payment on delivery or before the goods had reached their destination. Now, however, that the millers are willing to make good any reasonable claim arising from the quality of the commodities received, they always prefer to buy from the millers direct.

The average difference between the sale price asked by the miller and the retail seller respectively amounts to about $10 per ton, not including carriage, which is not excessive allowing for the expense of storing.

A car-load is twenty tons net. The Official Association of Feed Control in the United States recognizes the following classes of feeds, which unless special arrangements are made to the contrary, are generally recognized and accepted by the trade: Wheat bran—standard millings—red dog flour, a mixture of low grade flour and fine bran—wheat mixed feed (a mixture of bran and standard middlings in the proportions obtained by ordinary milling)—wheat bran and standard middlings (a mixture of the two latter in the proportions obtained by ordinary milling)—screenings—scourings.

414.—**A Study on the Pasteurization of Colostrum.**—RAGSDALE, A. C. & BRODY, S. *Journal of Dairy Science*, Vol. VI, No. 2, pp. 137-155. Bibliography. Baltimore, 1923.

Colostrum plays a very important part in the regimen of the calf by reason of the globulin and the defensive bodies which it contains, such bodies being absent in the early days of the life of the calves. It is

therefore necessary that these bodies and the globulin should be left intact when the colostrum of a tuberculous cow is to be disinfected. Disinfection can be carried out by means of pasteurization by placing the vessel containing the colostrum in a bath and warming by steam heating.

Care must, however, be taken to avoid the coagulation of the colostrum while heating for the purpose of sterilizing the tubercle bacilli. The following shows the time required at different temperatures for obtaining these two results.

Temperature Degrees F.	Time required to inactivate the organism of tuberculosis in milk	Time required to thicken colostrum so that it barely flows
	minutes	
140·0	20·0	3 hours.
144·5	18·5	30–40 minutes.
149·0	14·0	10–15 "
153·5	7·5	4– 5 "
158·0	3·0	2 "
162·5	....	70–75 seconds.
167·0	....	45–50 "

These figures have an approximate value only and vary with the composition of the colostrum, but they show that colostrum may be safely pastuerized at 140°F.

In the experiment, calves that received pasteurized colostrum showed a mortality of 6 per cent, while for those that were fed a raw normal milk the mortality was at the rate of 32 per cent.

The figures amply justify the pasteurization of the colostrum and show that the process does not materially affect the protein or the protective bodies. Laboratory experiments have also proved that by heating to a temperature of 149° F, the value of the amboceptor or protective body is not diminished.

Further experiments are to be made with regard to the effect of heat on these protective bodies.

419.—The Necessity of Calcium and Phosphorus in the Diet of Dairy Cows.—MEIGS, E. B., *Journal of Dairy Science*, Vol. VI, No. 1, pp. 46-53. Bibliography, Baltimore, 1923.

The author after reference to the work of FORBES and HART, sums up the evidence so far presented by stating that it appears that liberally milking cows are usually able to maintain themselves in calcium and phosphorus equilibrium when they receive an abundance of good lucerne hay, combined with concentrated goods, rich in phosphorus.

The Department of Agriculture of the U.S.A. is at present making an experimental test to establish the value of coarse foods with a low calcium content which are fed instead of lucerne. To one group of cows is given a mixture of grains high in protein and timothy hay only, or timothy hay and silaged maize; another group received the same rations with calcium carbonate added, or a ration containing the same or approximately the same protein content but with lucerne hay, instead of timothy. These experiments have not yet been completed, but the results obtained, show that sooner or later the yield of milk from cows who receive forage with a low calcium content, is greatly diminished and that this decrease is mostly due to the calcium deficiency.

On the other hand it appears that the liberally milking stall-fed cows can be kept in calcium equilibrium only if fed on large quantities of forage with a high calcium content as for example, lucerne hay.

Since the experiments of FINGERLING and HART, many others have been made, and seem to indicate that the assimilation of calcium and phosphorus is influenced by vitamines. Dairy cows on pasture can maintain calcium equilibrium on a smaller absolute calcium intake than those on dried materials with or without maize silage.

FORBES reported that in the case of cows that were dry or giving only small amounts of milk, the calcium and phosphorus balances were both usually positive. The cows used in these experiments, however, received lucerne hay.

Some tests were made by the Department of Agriculture of U.S.A. to determine what influence the substitution of timothy hay for lucerne had on cows giving small amounts of milk. Cows on timothy hay have continued to give a small amount of milk for many months consecutively, but these cows were being fed on rations which contained much more protein and nutritive matter than they required according to any of the feeding standards.

It is likely, therefore, that the results indicated only confirm the theory that cows giving small amounts of milk can eat much more food than they require, and compensate in that way for the absence of a particular substance in the rations given to them.

It is perhaps not too strong a statement that it is always bad practice not to include liberal quantities of leguminous hay in the rations of dairy cows which are receiving only dry seeds and silage.

The dairy farmer must not expect to obtain a large yield of milk in winter if he cannot give his cows lucerne and other leguminous hay in large quantities. It will probably pay him to see that each of his cows has a dry period of two months and that during this period she receives twice the maintenance ration in protein and total nutrients.

The author also states that so far experimental work has not been sufficiently advanced

to demonstrate whether lucerne hay can be replaced by other leguminous hays to provide a source of calcium, or how the calcium requirements of cows on different kinds of pastures can be supplied.

71.—**Food Value of Coconut Cakes, Coconut Meal and Ground Linseed for Dairying.**—Hansson, N., *Landbruks-Akademiens, Handlingar och Tidskrift*, No. 6, pp. 497-519, Stockholm, 1922.

During the winter months of 1921-1922 the Department for Feeding Research of the Swedish Agricultural Experiment Station has carried out feeding experiments in order to ascertain the food value of coconut cakes, coconut meal (extracted) and ground linseed for dairy cows. The feeding experiments with the coconut foods have been carried out as group trials with 42 cows on two farms. In these experiments a daily ration per cow of 3·3 pounds of coconut cakes or of 3·3 pounds of coconut meal was replaced by a ration of 4 pounds of wheat bran and one third of a pound of peanut cakes. With linseed only one trial (carried out as a period trial) has been made. In this experiment a ration of 2·2 pounds of wheat bran was given. The results obtained in these experiments can be summed up as follows:—

(1) That coconut cakes and coconut meal are excellent foods for dairy cows with a favourable effect on milk production and in dietetic respects.

(2) That coconut cakes as well as coconut meal increase the percentage of fat in milk.

(3) That this effect is dependent partly on the percentage of fat in the food mentioned so that cakes containing 7-8 per cent of fat, on the whole, increase the percentage of butter fat in milk more than meal containing only 3-4 per cent of fat.

(4) That this effect of coconut foods furthermore is dependent on the amount of the coconut foods given daily, the length of the periods of the trials and the other foods given at the same time.

(5) That the capability of the coconut foods to increase the percentage of butter fat in the milk is so general that of 30 cows, which have been given this food in these experiments, 28 have reacted in the same direction, while it was found that one of the two other cows was suffering from an abnormal state of health.

(6) That if consideration is given to the effect of the coconut foods both as regards the quantity of milk and the production of fat, about 1·9 pound coconut cakes of the composition proved here ought to be considered equal to one food unit.

(7) That under the same conditions about 2 pounds of coconut meal with 5·5-5 per cent of fat is required to equal one food unit.

(8) That ground linseed given to dairy cows substantially increased both the percentage of fat in the milk and the total butter fat production.

(9) That one pound of linseed of normal composition seems to have about the same nutritive value as 1 pound of ground oats plus 1 pound of wheat bran.

(10) That ground linseed is well liked by the cows, has a good dietetical effect on the animals as well as a favourable influence on their coat of hair.

258.—**The use of Germinated Oats and Barley as a Feed for Laying Hens.**—Legendre, G., *La Revue Avicole*, Year 33, No. 2, pp. 57-59. Paris, 1923.

Green food is a necessity in winter if fowls are to keep their health. It can be fed, however, in the form of germinated seeds, especially oats and barley; in this manner the poultry obtain at the same time all the benefits of a grain ration. Oats are generally employed for this purpose.

A germinating apparatus is very easily made, for it consists essentially of a stand upon which several lattice work trays can be placed one above another like drawers. Four deal uprights 1½ or 2 inches broad and from 6 to 7 feet long are placed at each corner and firmly fixed. Every 12 inches up these verticals are placed horizontal bars of 1 x 2 inches upon which the trays slide. The latter are 2 feet wide and 2 inches deep, their sides are made of boards about 1 x 2 inches and at the bottom are strips of wood ½ inch in width, placed at intervals of ⅛ inch and securely fixed to the frame. These trays which are exposed to the continual moisture of the germinating oats must be of hard planed wood, although the frame can be of deal.

One and a half gallons of oats of good quality are placed in a sieve and over them are poured one and a half gallons of tepid water, the temperature of which should be a little under 100° F.

In order to prevent the growth of moulds, a small teaspoonful of formalin should be added. After 48 hours as a maximum, the oats can be spread on the lower tray of the stand described above. The layer of seed ought not be more than 1 inch thick in order to avoid any injurious rise in the temperature. Then the whole apparatus must be placed near the window of a well ventilated room having a temperature of 60° to 68° F.

The oats are well sprinkled twice a day with water at the room temperature. The day after it has been placed in the stand, the first tray is moved to the second shelf, and another put in its place. Each tray thus moves up a shelf higher every day. Until the seedlings have reached the length of ⅛ inch the oats should once a day be moved about to allow the seed to germinate readily. After the seedlings have attained this

size, it would be disadvantageous to disturb them.

By the time the tray reaches the top shelf, all the seedlings ought to be 4 to 5 inches long and may then be fed to the hens. If they are allowed to grow beyond 6 inches the food supply of the seed is exhausted.

In a heated germinator, the number of shelves may be reduced to 4 and the oats can be given to the poultry on the fifth day (one day of soaking and 4 of germination).

Two and one-fifth pounds of oats give about eight pounds of germinated grain. With the 24 pound of germinated oats that can be obtained every day from trays of the size described, the ration of 500 fowls can be supplemented, as they must not be fed more than $\frac{2}{3}$ of an ounce of oats per head per day. A larger amount might cause diarrhoea, while if as much as $1\frac{1}{2}$ ounces are given this feed is actually dangerous to the birds.

The apparatus must be disinfected after use; the author recommends for the purpose a 5 per cent solution of formalin, which effectually prevents any growth of moulds on the trays.

Barley when treated in this manner absorbs the same amount of water, but takes longer during the process.

431.—**Foul Brood.** *Ministry of Agriculture and Fisheries*, Leaflet No. 32, 6 pp. London, 1923.

There are three varieties of foul brood: the virulent form with strong smell due to *Bacillus alvei*, the odourless type caused by *B. Burri*, *B. Brandenburgiensis* and *B. larvae*, and the foul brood of which the pathogenic agents are *B. Guntheri* and *Streptococcus apis*. The latter often accompanies virulent foul brood and does not form spores. The bacilli can be seen at the beginning of the disease, but when it has reached an advanced stage, they form spores and disappear. The spores are resistant to freezing, carbolic acid, thymol, salicylic acid, napthol B, perchloride of mercury, creoline, lysol, oil of eucalyptus and napthaline. The last 4 substances, which become volatile at the ordinary temperature of the beehive, hinder the growth of the bacilli, but have no effect upon the spores which can be placed for two months in a solution containing 5 per cent of carbolic acid, or immersed for 15 minutes in boiling water without any injury. The disease must therefore be controlled during its early stages. For the prevention and cure of foul brood, the author recommends the following measures:

(1) When the bee-keeper has been in contact with an infected colony, he should wash his hands and disinfect his implements with carbolic soap or with a solution of carbolic acid (Calvert's No. 5), mixed with 12 times its weight of water. Before washing his hands or implements, he ought to remove by means of a little alcohol (pure or denatured) all the infected matter that is insoluble in water.

(2) If a weak colony is infected, it is best to destroy the bees, combs, frames and covers and to disinfect the hive. The bees can be killed by pouring a saturated solution of potassium cyanide into the brood-nest, care being taken to previously close any apertures by which the gas can escape. Another method is to suffocate the bees by passing sulphur fumes into the brood-nest. The dead bees, together with the combs and covers ought to be buried to avoid infection. The operation is best carried out at night when the bees stop flying. It is necessary to disinfect the hive also, this may be done by flaming the inside with a soldering lamp or covering the internal walls with paraffin or petrol and setting fire to these substances.

(3) If the disease breaks out in a strong colony, the bees can be saved by making them swarm artificially into a box or basket, and shutting down the lid. Care must be taken to insure their having sufficient air. The colony is then put in a cool place for 48 hours and fed; after this interval the bees are put into a hive with moveable frames and treated like a swarm being given syrup mixed with napthol B and kept moderately warm. Any of the insects that die during the treatment should at once be burnt.

When the disease occurs in a light form, fumigation or disinfection is sufficient; this may be effected by suspending from the division-wall a sponge or piece of flannel soaked once every six days in 40 gm. of formalin, 2 balls of napthaline being left during this time in the brood-nest.

435.—**Renewal of the Combs in Bee Hives.**—Ayme, H., *Journal d'agriculture Pratique*, Year 87, Vol. I, No. 2, pp. 32-34. Paris, 1923.

The author has noticed that when bees instinctively realise the necessity of renewing their combs, this knowledge often comes to them rather late, and that man can supply their needs in this respect in a more timely and satisfactory manner. Experience has proved that when a colony does not thrive, in spite of having been provided with plenty of food and with a young queen, this is to be attributed in nine cases out of ten to the hive being too old, or having been accidentally deprived of its queen, with the result that the central combs serving as brood-combs are in a bad condition. The remedy consists in the removal of all old frames containing neither brood nor honey, and their renewal by new frames. If the old ones

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contain some honey they can be placed at the ends, but as soon as the brood has hatched out, such defective frames should be entirely discarded. By the adoption of this system, two years are amply sufficient for the complete renewal of the brood-combs in a hive with 12 to 14 large frames. The use of corrugated wax greatly facilitates the operation which, in the opinion of the author, should be carried out every 6 years, though in order to disturb the bees as little as possible, it is well to renew two or three combs every year instead of substituting 5 or 6 new ones at a time.

The deterioration of the combs is due: (1) the cavities of the cells become reduced in size owing to accumulation of the outer silky coverings left behind by the chrysalides; (2) the bees, or some of their enemies gnawing the cells; (3) the excess pollen deposited by the bees upon the combs surrounding the brood-comb. This pollen decomposes in time and is the chief cause of the necessity of renewing the combs. The combs can, however be cleaned by washing, they are left to soak for twenty-four hours in tepid water, after which a small jet of water is directed upon each comb in turn. If the operation is not successful, it is necessary to scrape away the cells with a knife until the corrguated wax is exposed, when the bees will construct new cells upon it in the same manner as they do upon new corrguated wax.

129.—The Copper Content of Cow's Milk.—SUPPLEE, G. G., and BELLIS, B., *Journal of Dairy Science*, Vol. V, No. 5, pp. 455-467. Baltimore, 1922.

Many records are available which prove the presence of copper in animal and vegetable susbstances but the references to the copper in cow's milk are rare. The author proposes therefore to furnish data showing the variation in copper content of cow's milk, freshly drawn, and after being in contact with metallic copper,—a likely occurrence in milk establishments. The data is the result of 2 years work in connection with research on dessicated milk products.

Copper was found to be a normal constituent of freshly drawn cow's milk. The amounts found in milk of individual animals varied from 0·3 to 0·8 mgm. per litre. The average amount found in 23 of such samples was 0·52 mgm. per litre. Apparently neither feeding on pasture nor in the stall has any effect on the copper content of milk.

The amount of copper in milk may be considerably increased by storing and heating in a copper utensil. Slight increases in the copper content may also result from the passage of milk through copper pipes from which the tin has been worn off. Copper from this source, however, is less than that from the formation of copper compounds round brass or bronze fittings as a consequence of inadequate sanitary arrangements.

The significance of minute amounts of copper in plant and animal tissues is so far unknown. Its presence in milk particularly when taken up as extraneous contamination, may prove to be significant in connection with the high susceptibility of the anti-scorbutic vitamine to oxidation. In fact, the destruction of this vitamine by acceleration of oxidation as a result of pasteurizing milk in a copper vessel has already been reported.

IMPLEMENTS AND MACHINERY

281.—System of Protection of Tractors Against Frost.—*The Implement and Machinery Review*, Vol. 48, No. 571, p. 891. London, 1922.

Serious accidents, such as the cracking of the radiators and the cylinder covers, have been caused by the freezing of the cooling water, with consequent expensive repairs and throwing the machine out of work, for some time. Undoubtedly the simplest way to prevent such accidents would be to empty the radiator whenever there is danger of frost; this remedy, however, is dependent on the human factor and forgetfulness may prove costly.

Another expedient is to lower the freezing point of the cooling water by means of mixing with it glycerine, methylated spirit and chloride of lime.

These remedies also have drawbacks because glyercine soils the tubes of the radiator and the pump, and decreases the power of cooling: methylated spirit evaporates gradually at 80°C. and chloride of lime alone gives good results.

The problem has now been solved mechanically by a French engineer who has invented an apparatus by means of which the radiator is emptied automatically before the water is transformed into ice. A small apparatus formed of a copper worm and a chamber closed below by a valve, communicates with the lowest point of the radiator. When the temperature of the air falls, the water in the worm, owing to its small volume and the high conductivity of the copper, cools more rapidly than that in the radiator, consequently the water in the worm is transformed into ice while that in the radiator is still liquid. The increased volume of the mass of water owing to its transformation into ice, causes a piston to advance which operates the opening of the valve and consequently the emptying of the water in the radiator.

Experiments have shown that the apparatus works when the water in the radiator is still at 37·4° F and that all the water can be emptied before transformation into ice occurs.

473.—**The Importance of the Type of Feed-water for Boilers in Dairies.**—A. F. *Molkerei-Zeitung*, Year 37, No. 1, pp. 1-2. Hildesheim, 1923.

In every case, care must be exercised that the boiler is not rapidly destroyed by the water supplying it.

River water contains a larger or smaller percentage of mechanically transported material, after filtration the water is excellent for supplying boilers, since it contains few substances in solution, or at all events, many less than are present in subterranean water.

While the substances mechanically mixed with water are comparatively easily removed, it is much more difficult to get rid of those in solution.

The most imporant salts forming such deposits are:—Magnesium carbonate; calcium carbonate; magnesium sulphate; calcium sulphate.

Different waters vary greatly as to the presence and amount of these salts to which their hardness is due; I degree of hardness (German scale) corresponds to I gm. of calcium and 0·7 gm. magnesium in 100 litres of water.

The size of the boiler is a very important factor in determining the water that can be used; for a boiler of large capacity, the feed-water may have 10 degrees of hardness, but if the boiler is small the water must be softened, even if its hardness is only 6-7 degrees. The calcium carbonate and magnesium carbonate separate out during the process of boiling and form a deposit. Temporary hardness can be removed by heating the water to 80°-100° C. and adding at the same time some caustic lime, or caustic soda; 1 kg. of calcium must be added per 1,000 litres of water.

Sulphate of lime and sulphate of magnesium can be removed as a deposit by boiling the water and adding some calcined soda in the proportion of 1·9 gm. to every 100 litres of water to be softened. Care should however be taken not to introduce too large a quantity as this immediately induces the formation of froth. It is very advisable to add a soda solution until a faint blue coloration is produced on litmus paper. The litmus paper test should be applied every day.

Water from condensation of steam is also very suitable, as its heat can be utilized again and it is free from all-deposit-forming, or encrusting matter. Care must however be taken so that it does not contain any oil, which is very injurious to boilers; as a precaution, this water should be passed through a Koks filter, or through wood wool.

AGRICULTURAL INDUSTRIES

486.—**Injurious Action of Light on Butter.**—Lauterwald, F., *Molkereizeitung*, Year 37, No. 17, p. 309. Hildesheim, 1923.

Basing his remarks on personal experience in the capacity of "Molkerei instruktor" (Instructor of the Dairy and Dairy Products Industry), the author lays stress on the strong action of light upon butter which is far more injurious than is stated by treatises on the subject, or believed by practical dairymen. Ten minutes exposure to brilliant sunshine is enough to give a sebaceous appearance and flavour to the finest sample of butter. He therefore advises the following technique:—the butter must be worked as soon as it comes from the churn, salted, made up, and at once taken into the dairy (which must be dark, damp and well ventilated); there it should be left to drip until the next day, again made up, put into barrels and the covers put on. The windows of the butter dairy must be red, yellow or grey. The custom of exposing butter for sale in the shop-window should be abandoned, even if it is covered over to keep it dark. Also in the house, the butter should be kept in yellow, red or grey glass vessels and never in green, blue or colourless receptacles.

489.—**Honey and Atmospheric Moisture.**—Waters, R., *The New Zealand Journal of Agriculture*, Vol. XXVI, No. 2, pp. 106-107. Wellington, 1923.

From the results of laboratory experiments the author concludes that in a dry atmosphere, the water content of honey rises with its increase in specific gravity whereas a lower specific gravity allows the water to escape more easily. On the other hand, when the atmosphere is saturated with moisture, honey with a higher specific gravity is able to absorb relatively more water in a given time than honey with a low specific gravity. In a saturated atmosphere, the samples used by the author were able to absorb water much more rapidly than they could yield it up in a dry atmosphere.

The author found on exposing honey to natural atmospheric conditions, but protecting it from the sun, that it slowly reaches a stage of equilibrium as regards gain and loss of water, after which its moisture content varies with the changes in atmospheric moisture but in a lesser degree. These variations would, however, seem to be more perceptible as the temperature of the atmosphere rises.

By exposing the honey to the air only during the hours of sunshine, the author proved that the quality of honey depends

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upon temperature. In fact, at a temperature of 10° C. to 15° C. the specific gravity of a good honey decreased by 0·001 in 2 or 3 days whereas when the temperature is from 15° to 26° C., the specific gravity of a honey of poor quality increases 0·001 every 8 or 9 hours.

PLANT DISEASES

510.—**Apple Canker (Nectria Galligena) Infection through Scab Wounds.**—WILTSHIRE, S. P., *Annals of Applied Biology*, Vol. IX, Nos. 3-4, pp. 275-281, tables I. London, 1922.

The author has referred in a previous paper to the fact that the canker fungus (*Nectria galligena* Bres) can enter the apple tree through wounds caused by scab fungus *Venturia Inaequalis*, and in this article describes this process in detail.

The scab fungus infects the shoots of apple trees during the autumn following their growth; in the spring most of the pustules are surrounded by a cork layer and are subsequently completely separated from the tree, the only trace of infection being a slight roughness of the bark, which facilitates the entry of the canker. If the tree is sufficiently vigorous to form a cork layer round such a scar before the wood has become infected, the canker makes very little progress otherwise the fungus develops in the normal way.

A microscopic examination reveals the presence of two mycelia somewhat difficult to distinguish between, but generally speaking that of the scab fungus appears dark and inclined to be thick walled, whilst that of the *Nectria* fungus is hyaline and thinner.

The penetration of *Nectria galligena* into the cortex is described in detail. During the summer the progress is slow, as was confirmed by observations.

As regards control measures, it seems that it is not only a question of protection of fruits, but also of the bark injured by the scab *Venturia*. Winter spraying, immediately after defoliation has proved effective.

OTHER ARTICLES ON SCIENCE AND PRACTICE OF AGRICULTURE

On account of lack of space the following articles in the International Review of the Science and Practice of Agriculture can only be referred to. Anyone desiring the articles may obtain them from the Institute Branch, Department of Agriculture, Ottawa.

An Inquiry into the Question of Saving a Part of the Phosphatic Fertilizers in Germany.—AEROBOE, F., in *International Review of the Science and Practice of Agriculture*, April-June, 1923, pp. 298-304.

Leucite in Agriculture.—D'OSSAT, G. de A., in *International Review of the Science and Practice of Agriculture*, April-June, 1923, pp. 305-316.

The European Seed Testing Association.—DORPH PETERSEN, K., in *International Review of the Science and Practice of Agriculture*, April-June, 1923, pp. 317-321.

161.—Weather and Crop Yield. WARREN SMITH J., *Monthly Weather Review*, No. 50 Part II, pp. 567-572. Washington, 1922.

162.—**The Resistance Shown by Numerous Varieties of Wheat at Svalof During the Winter, 1921-1922.** AKERMAN, A., 1922. *Sveriges Utsädesförenings Tidskrift*, Year XXXII, Part 5, pp. 252-260. 1922.

175.—**Characteristics of Wheat of Bihar and Orissa (India) and Comparative Rust Resistance**—HOWARD, A., HOWARD, G. L. C. and KHAN, A. R., *Memoirs of the Department of Agriculture in India, Botanic Series*, Vol. XII, No. 1, pp. 1-20. Calcutta,—London, 1922.

191.—**Studies and Experiments Connected with Cereal Cultivation in Italy.**—STRAMPELLI, N., *Nuovi Annali del Ministero per l'Agricultura*, Year II, No. 2, p. 311-333. Rome, 1922.

223.—**Studies on Swine Feeding.**—I. SPOTTEL, W. and TANGER, E., *Zeitchrift fur Schweinezucht*, Part 10, pp. 145-152; Part II-pp. 164-166. Neudamm, 1922.

II. MULLER and RICHTER, *Ibidem*, Part 19, pp. 296-299, 1922

III. MULLER and SANDBRINK, *Deutsche Landwirtschaftliche Presse*, Year 49, No. 40, pp. 276. Berlin, 1922.

IV. THOMPSON, J. I. and VOORHIES, E. C., *College of Agriculture, Agricultural Experiment Station, Berkeley, California, Bulletin* No. 342, pp. 375-396. Berkeley, 1922.

V. STARKEY, L. V. and SALMON, W. D., *South Carolina Experiment Station of Clemsoa Agricultural College Bulletin* 213, 8 pp. Clemson College, 1922.

227.—**Means of Controlling Diarrhœa and Arthritis in Foals**—CONN, G. H., *Live Stock Journal*, Vol. XCVII, No. 2545, p. 39. London, 1923.

243.—**The Scientific Feeding of Dairy Cows**—MALPEAUX, L., *Le Lait*, Year 2, No. 9, pp. 778-786. Lyons, 1922.

254.—**Selecting and Rearing Brood Sows.**—*Live Stock Journal*, Vol. XCVI, No. 2538, p. 520. London, 1922.

255.—**Toe-Pecking in Chickens.**—GRASHUIS, J., *Tijdschrift voor Diergeneeskunde*, P 50, p. 43-44. Utrecht, 1923.

278.—**Electric Power for Country Districts.**—DELAMARE, A. H. C., *Journal d'Agriculture Pratique*, Vol. 37, No. 24, pp. 481-482; Vol. 37, No. 25, pp. 502-503. Paris, 1922.

280.—**Steam Horse Power and Living Horse Power.**—RINGLEMANN, H., *Journal d'Agriculture Pratique*, Vol. 38, No. 36, pp. 215-217, Paris, 1922.

297.—**Ensilage Experiments Made in Germany.**.—VAN WENCKSTERN, H., *Deutsche landwirtschaftliche Presse*, Year 49, No. 14, p. 104. Berlin, 1922.

301.—**The Preservation of the Purity of Milk.**—DE MONTCAULT, P., *Journal d'Agriculture Pratique*, Year 86, Vol. 2, No. 43, pp. 349-350. Paris, 1922.

304.—**Variations in the Microbic Content of Butter in Cold Storage.**—DALLA TORRE, G.—*Annali del l'Institute sperimentale di Caseificio in Lodi*, Vol. I, No. 5-6, pp. 169-198. Lodi, 1922.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS.

The following is a brief summary of the contents of the more important articles in the July-September number of the Institute Bulletin. Persons interested in any of the articles may obtain the original Bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

The Country Life Movement in the United States.—After an account of pioneer life in the United States from 1790 to 1880 the author gives a summary statement of the work of the Country Life Commission appointed by President Roosevelt in 1908. The report of the Commission although not acted upon by Congress aroused the interest of the nation in rural conditions. The article then deals with the rural housing problem, rural schools, the rural church, rural health, rural trade centres, and rural municipalities. A list of books on country life literature is given, including those giving the results of social surveys.

Latifundia in Sicily and their Possible Transformation.—34 pages. The *latifundia* are large estates under a single management on which extensive cereal cultivation alternating with pasture is carried on. The author gives an interesting description of agriculture in Sicily, describes the social and economic factors of the *latifundium*, and the process of breaking them up into small holdings.

The Central Co-operative Banks of The Rural and Agricultural Co-operative Societies in Germany.—25 pages. The co-operative central banks which are the subject of this article are a group of central co-operative societies. They are co-operative credit societies, but their dealings are not confined to co-operative credit societies merely, but cover all the various rural and agricultural co-operative societies. They are the banks of the individual co-operative societies. Their shareholders (members) are the individual co-operative societies, and just as the farmer's business is bound up with the work of the society he has joined, so the business of the single societies is bound up with that of the central banks, of which they are constituent members.

It is the business of the central co-operative banks to assist the individual societies at points where on account of their isolation their power of acting for their members is too much restricted. They are confined, however, to financial transactions. As regards co-operative credit societies, the central banks undertake all the business of investing or obtaining capital according as the individual society has a surplus or a deficit.

The central banks act as financing institutions for the co-operative trading societies. Their co-operative functions consist in carrying out the business operations resulting from the credit transactions they effect between the societies. The co-operative societies assign to the central banks the following functions:—

1. The opening of deposit accounts with interest for surplus funds, with repayment at sight, or after notice given.

2. The granting of credit with certain conditions as to interest and commission, such conditions not to prejudice the profits of the business of the debtor societies, together with such conditions as to repayment as take into account the particular activities of the debtor societies. Securities are required, though these are not such as are usual in the case of ordinary commercial banks.

These two main functions have been established and carried out from the first, but as time went on the following were added:

3. Precautionary measures in respect of the maintenance of the solvency of the whole group of interests, *i.e.*, of the central bank and of the affiliated co-operative societies.

4. Advice to the societies as regards their investments and transactions in relation to them, *e.g.*, the redemption of bonds as drawn, control of claims to be made in reference to bonds, the payment of dividend warrants and their renewal, safe-custody of securities, etc.

5. Payments without actual transfer of cash.

To sum up, single societies by the fact of their isolation are incapable of successful dealing on the money market. The function of the central banks is to establish relations between the societies and the money market and to maintain such relations when once created.

The article deals further with the legal form of the central banks, the different forms of centralization, capitalization, the organization of the banks, the conditions on which the supply of credit is based, administration of the central banks, etc.

Other Articles in the July-September Number

Provident Land Clubs in Spain; Agricultural Economic Questions at the Eleventh International Agricultural Congress, Paris, May, 1923; Rebuilding of Villages and Farms in France by Co-operative Societies; National Federation of Associations for the Supply of Electricity in Rural Districts in France; The Capitalization of Agricultural Organizations in Germany; Agricultural Co-operation in England and Wales in 1921-22; Agricultural Co-operation in Scotland in 1921; Agricultural Co-operation in Ireland in 1920-21; Recent Statistics of the Italian Popular Banks; Agricultural Co-operation in South Africa in 1922; The Mortgage Loan Bank of Chili; The Consolidating Law on Agricultural Credit in Italy; The Land and Agricultural Bank of South Africa; The Club Markets of South Carolina; Progress of Land Settlement in Australia; Agrarian Reform in Hungary; Small Rural Property in Italy; Changes in the Occupancy, Ownership and Tenancy of Farms in the United States During 1922.

CURRENT NOTICES.

Decree Respecting the Control of the Colorado Beetle of Potatoes in France.

The Journal officiel de la République française (No. 57 under date of February 27, 1923) has published the decree of February 13, 1923 which contains the regulations of the authorities for the application of the law of July 13, 1878, amended by the law of July 13, 1922, dealing with the measures to be adopted for the control of the Potato Colorado Beetle. (*International Institute of Agriculture Bureau of Agricultural Legislation, Textes législatifs de l'année 1923*, No. 1.).

Law Relating to the Export of Cattle into Great Britain.

(December, 1922)—Under the terms of this law (except in cases specially mentioned), it is permitted to import into Great Britain, Canadian breeding-cattle without their treatment, or slaughter, according to the provisions of the first part of the third appendix of the law of 1894 dealing with stock diseases. This law is provided with an appendix for the regulation of the trade in imported cattle. (*International Institute of Agriculture, Bureau of Legislation, Textes législatifs de l'année, 1922, No. 30*).

The New Zealand Dairy Industry Amendment Act of 1922.

This Act regulates the analysis of the milk fat to be used in the manufacture of milk-products and requires the managers of milk-product factories to register the amount of milk consigned by each producer and the yield of the said milk in cream, butter and cheese; a copy of the registration form must be given to every supplier of dairy produce.

School of Agricultural Mechanics at Mons (Belgium).

This school was founded in 1902 with the object of acquainting agriculturists with the most improved types of machines and teaching them how to handle, repair and keep them in order. This school was the first of the kind ever

instituted either in Belgium, or elsewhere, In 1907, the School passed under the management of the Province which fitted it up with large plants. On November 4, 1920, the Provincial Council voted the credit necessary for opening a section for students learning to make agricultural machines. The workshop of this new section, which has an entirely modern equipment, started normal work on December 1, 1922, with a dozen students. The course of study and the apprenticeship last two and a half years. Pupil machine-drivers are not admitted under 16 years of age. They attend the courses and the repairs-workshop for three months and learn to drive and keep in order the machines by practical work in the open during the proper season. Particulars of the course and the regulations can be obtained from the "Direction de l'Ecole de Mécanique agricole", 25 Boulevard des Etats-Unis, Mons, Belgique.

Agricultural Experiment Station of Rhode Island State College, United States.

Bulletin No. 190 of this Station deals with the assimilation powers of certain cereals and their susceptibility to fertilizers. By assimilation is understood the capacity of the plant to abstract from the soil the substances necessary to its existence without recourse being had to fertilizers. The bulletin gives the results of 10 years' experiments made in the field and in pots with the object of determining this capacity.

Agricultural Experiment Station of Wisconsin University, Madison.

Bulletin No. 346 of this Station, entitled Marketing by Co-operative Sales Companies, treats of the co-operative sale of Wisconsin cheese by means of these Sale Companies. The cheese has been sold in this way for eight years by the Wisconsin Cheese Producers' Federation. The success obtained warrants the foundation of similar Companies for the sale of butter, tobacco, livestock and other agricultural products. The bulletin explains the special advantages of Co-operative Sale Companies and suggests a scheme for their formation.

Re-Organization of Cheese-Making Research and Instruction in Italy and Abroad.

About 40 million hectolitres of milk are produced annually in Italy, at least half being absorbed by the dairy industries, while the rest is consumed in its natural condition. There are over 6,000 cheese factories in the country; these are situated chiefly in Lombardy, Emilia, Piedmont, and Veneto. Less than 1,200 of the factories are run on co-operative lines, and about 80 per cent do not work up more than 10 quintals of milk per day. The annual output of dairy products is about 2 million quintals of cheese and 250,000 quintals of butter.

The existing scientific and teaching institutes devoted to the dairy industry are mentioned. Similar information is furnished for Switzerland, France, Germany, Sweden, Hungary and Argentina.

The Recommendations of the XI International Congress.

On May 28 last, the *Congrés international d Agriculture* which had been atended by the delegates of many States, terminated its work at Paris. At its closing session, the International Agricultural Commission was complete, the representatives of two new States, Poland and Czecho-Slovakia being also included.

Then follow expressed in brief terms, the resolutions passed and the recommendations made by the Congress with a notice to the effect that those recommendations, which specially refer to questions of agricultural economy, are given *in extenso* in the *Rivista Internationale delle Istituzioni Economiche e Sociali*, Year I, No. 3.

I. *Section: Agriculture.*—(1) *The Legislative protection of new plants*, which are to be regarded as patented products, exact and severe regulations to be passed to prevent the fraudulent sale of new varieties of seed-wheats and to control the names under which they are sold. (2) *The Constitution of an International Association of Plant Selectionists* surported by the various Governments and connected with similar national Associations. (3) *The Co-ordination of Studies of Cereal Rusts*, it being suggested that for the present, Hayes and Stakman's scale should be adopted for determining rust resistance. (4) *Protective Measures Against Degeneration in Potatoes* based on systematically conducted studies, the encouragement and popularization of seed tubers selection, the selection being controlled and guaranteed by a certificate of authenticity, th immunity of the seed potatoes from the serious parasites, *Doryphora* and *Synchytrium* being especially vouched for by a certificate of the country of origin. (5) *The widest employment of agricultural machines* favoured by the Governments and Associations and the *organization of practical instruction for rural mechanics.*

II. Section: *Influence of Agriculture upon International Relations.* (1) *Development of international relations between Agricultural Associations with the object of peace propaganda* (See *Riv. Int. delle Istitutuzione Economiche e Sociali* mentioned above. (2) *International Institute of Agriculture.* Recognizing the services already rendered by this Institute, the Governments ought to study the means by which its efficiency can be increased in order that agriculturists may in their turn derive the fullest benefit from its work. (3) *Unification of the methods of customs control* on the basis of the conclusions announced by the International Conference held at Paris in 1910. (4) *Regulation of the trade in commercial products.* (See *Riv. Int. delle Istituzioni Economiche e Sociale* already mentioned).

III. Section: *Rural Economy.*—For most of the recommendations made respecting this section, and in particular for: (1) *The material and moral improvement of rural workers:* (2) *Agricultural Associations;* (3) *The System of Land Transfer in various countries and the means of reducing its cost;* (4) *Agricultural profits and fiscal burdens on agriculture;* (5) *Financial independence of professional agricultural organizations;* (6) *Agricultural Politics;* (7) *Improvement of the social conditions of agricultural workers.* See *Riv. Int. delle Istit. Econ. e Soc.* mentioned above. As regards agricultural bookkeeping, it was suggested that the elementary knowledge of this subject should be imparted in rural districts by means of instruction in the schools and text books on the subject, and that co-operative societies should institute special bookkeeping offices for the assistance of all agriculturists and especially of the poorest; special instruction being provided for training administrators, directors, and bookkeepers for the various agricultural associations. It was also suggested that similar methods of analyzing agricultural management should be adopted in all countries, in order to facilitate international exchange of views.

IV Section: *Cattle Economics.* Institutions for the *control of the yields and feeding of milch cows* would afford a means of developing and selecting dairy stock. The Congress not only recommends an extensive propaganda in order to extend the cultivation of forage crops, but also urges the institution and development of co-operative dairies, the formation of syndicates for the common purchase of breeding stock, and the wholesale purchase of stock-feeding fertilizers, etc.; the development of good cheese-making schools; the organization of rapid means of transporting milk and its derivatives; the adoption in the different countries of uniform measures for controlling milk and butter production (sample-taking, weighing, certificates); the practical and scientific instruction of expert milk controllers (2) The Congress urges the necessity of the different countries to adopt the same rules for judging breeding-stock (these rules being in accordance with the principles directing scientific breeding) and the regulations for the registration of stock in *pedigree books.* The latter, for instance, should be *closed,* and after they are closed, no animals should be registered unless they are the offspring of parents already on the register, in which case, as a rule, a confirming test is also to be required. (3) the adoption in the various States of *health certificates* and of *certificates of origin,* like those granted in Holland, was also recommended. (4) The formation of a *Permanent International Breeding Office* to deal with matters relating to the improvement and economics of live stock was proposed. (5) *The unification of breeding methods was recommended.* (6) Also a detailed bookkeeping system supplying exact data respecting mechanical traction and finally. (7) the Congress recommended that the study of foot-and-mouth disease should be carried out in all the different States.

V. Section: *Vine-growing.*

VI. Section: *Sylviculture.*

VII. Section: *Agriculture in Tropical Countries.*

French Competition for the Cultivation of the Finest Ear of Wheat (1923).

This competition was organized by the Bourdeaux Press, and has been held every year from, and including 1918. It is under the patronage of the Ministry of Agriculture, the Departmental Agricultural Office of the Gironde and other bodies.

The objects of the competition are: (1) to promote and popularize the practice of selecting the hardiest local varieties of wheat producing most grain and which have the highest milling and breadmaking yield, in order to obtain the maximum production of good bread per unit of surface; (2) to interest the youth of France in wheat cultivation. Further information is given under the heads: classification of the ears; technical part; selection, cultivation; final classification.

Sowing by Aeroplane.

Sowing from an aeroplane has been carried out in California, where in the neighbourhood of Lake Tulare the soil is excessively damp and cannot be worked at the sowing season, which makes it very difficult to carry out seeding in the ordinary manner. Finally an aviator flying at a height of 15 m. succeeded in scattering 360 kg. of seed over 6.5 hectares of this land. The seeds went deep enough into the soil to insure germination. The cost of this method of sowing is estimated at $6 per acre. (*Cerealia*, March 6, 1923).

AGRICULTURAL STATISTICS

THE WHEAT, RYE AND POTATO CROPS OF 1923

WORLD'S PRODUCTION OF WHEAT

Countries	Area			Production			Yield per Acre		
	1923	1922	Average 1917-21	1923	1922	Average 1917-21	1923	1922	Average 1917-21
	M acres	M acres	M acres	M bush.	M bush.	M bush.	bush.	bush.	bush.
EUROPE:—									
Germany	3,653	3,396	3,380	103,605	71,934	89,798	28·4	21·1	26·4
Austria	475	460	373	8,826	7,422	5,693	18·6	16·1	15·4
Belgium	341	300	331	12,589	10,615	11,778	36·9	35·4	35·6
Bulgaria	2,259	2,226	2,208	38,783	37,705	29,621	17·2	16·9	13·4
Denmark	205	237	160	(a)8,600	9,949	7,017	42·0	41·9	43·9
Spain	10,489	10,309	10,318	157,112	125,470	138,279	15·0	12·2	13·4
Jugoslavia	3,606	3,723	3,630	61,894	44,472	47,411	17·2	11·9	13·1
Finland	31	22	21	472	296	335	15·2	13·5	16·0
France	13,657	13,072	12,507	290,477	243,317	249,165	21·3	18·6	19·9
England and Wales	1,741	1,967	2,109	56,560	62,492	65,698	32·5	31·8	31·2
Greece	1,071	890	1,044	13,356	9,553	10,722	12·5	10·7	10·3
Hungary	3,411	3,523	2,775	67,677	54,729	45,505	19·8	15·5	16·4
Italy	11,555	11,489	11,088	224,838	161,643	166,367	19·5	14·1	15·0
Latvia	64	70	46	1,273	958	784	19·9	13·7	17·0
Lithuania	202	194	163	3,165	3,374	2,562	15·7	17·4	15·7
Luxemburg	25	23	26	522	173	478	20·9	7·5	18·4
Norway	25	25	37	549	643	912	22·0	25·7	24·6
Netherlands	153	150	154	6,678	6,063	5,773	43·6	40·4	37·5
Poland	2,514	2,574	2,123	48,272	42,451	37,723	21·2	16·5	17·8
Portugal	1,123	1,123	1,033	12,964	9,782	8,997	11·5	8·7	8·7
Roumania	6,632	6,548	5,524	112,939	92,008	69,937	17·0	13·1	12·7
Sweden	363	356	354	11,648	9,381	9,613	32·1	26·4	26·2
Switzerland	160	152	182	5,453	3,571	5,637	34·1	23·5	31·0
Czechoslavakia	1,507	1,527	1,561	36,537	33,621	32,522	24·2	22·0	20·8
Total Europe	65,262	64,356	61,147	1,284,789	1,041,622	1,042,327	19·7	16·2	17·0
NORTH AMERICA:—									
Canada	22,673	22,423	18,546	469,761	399,786	236,025	20·8	17·8	12·8
United States	58,253	61,230	60,960	785,741	862,000	834,802	13·4	14·1	13·7
Total North America	80,926	83,653	79,506	1,255,502	1,261,786	1,070,827	15·5	15·1	13,5
ASIA:—									
India	30,835	28,207	29,628	369,263	366,985	330,884	12·0	13·0	11·2
Japan	1,198	1,229	1,338	26,483	27,617	29,951	22·1	22·5	22·4
Total Asia	32,033	29,436	30,966	395,746	394,602	360,835	12·4	13·4	11·7
AFRICA:—									
Algeria	3,157	3,103	3,043	35,611	18,233	28,512	11·3	5·9	9·4
Egypt	1,537	1,518	1,275	40·654	36·648	32,167	26·5	24·1	25·2
Morocco	2,319	2,068	1,880	23,549	12,894	19,187	10·2	6·2	10·2
Tunis	1,433	882	1,454	9,921	3,674	8,416	6·9	4·2	5·8
South Africa	884	884	884	(a)7,000	6,696	7,984	7·9	7·6	9·0
Total Africa	9,330	8,455	8,536	116,735	78,145	96,266	12·5	9·2	11·3
SOUTH AMERICA:—									
Argentina	17,216	15,940	16,360	248,755	189,047	192,752	14·4	11·9	11·8
Chile	1,376	1,285	1,233	(a)23,000	23,815	21,987	16·7	18·5	17·8
Uruguay	979	663	802	(a)8,000	5,152	8,722	8·2	7·8	10·9
Total South America	19,571	17,888	18,395	279,755	218,014	223,461	14·3	12·2	12,1
AUSTRALASIA:—									
Australia	10,000	9,959	8,595	120,000	107,263	102,263	12·0	10·8	11·9
New Zealand	183	276	240	(a)8,000	8,416	7,075	.....	30·5	28·5
Total Australasia	10,183	10,235	8,835	128,000	115,679	109,338	12·6	11·3	12·4
GRAND TOTAL	217,305	214,023	207,385	3,460,527	3,109,848	2,903,054	15·9	14·5	14·0

(a) Unofficial figures.

WORLD'S PRODUCTION OF RYE

Countries	Area			Production			Yield per Acre		
	1923	1922	Average 1917-21	1923	1922	Average 1917-21	1923	1922	Average 1917-21
	M acres	M acres	M acres	M bush.	M bush.	M bush.	bush	bush.	bush.
Germany	10,786	10,237	10,628	282,455	206,051	233,180	26·2	20·1	21·9
Austria	921	844	750	15,634	13,589	10,765	17·0	16·3	14·7
Belgium	558	541	535	19,538	18,284	17,982	35·0	34·4	33·6
Bulgaria	457	442	465	8·480	7,453	6,186	18·6	16·9	13·3
Denmark	574	547	536	15,000	14,284	12,390	26·1	26·1	23·1
Spain	1,802	1,757	1,803	28,076	26,252	26,779	15·6	14·9	14 9
Esthonia	388	392	343	6,847	5,797	5,710	17·6	14·8	16·6
Jugoslavia	395	499	475	5,913	4,523	5,953	15·0	9·1	12·5
Finland	583	578	586	9,446	7,775	9,918	15·2	13·5	16·9
France	2,171	2,196	2,128	36,915	38,412	35,700	17·0	17·5	16·8
Greece	217	198	222	2,662	2,362	3,151	12·3	11·9	14·2
Hungary	1,650	1,663	1,408	32,111	25,148	21,856	19·5	15·1	15·5
Italy	311	320	316	6,449	5,563	5,675	20·7	17·4	18·0
Latvia	660	590	561	10,992	6,845	9,806	15·7	11·6	17·4
Lithuania	1,442	1,369	1,196	24,924	24,249	18,336	17·3	17·7	15·3
Luxemburg	20	20	19	409	250	360	20·5	12·5	18·9
Norway	30	30	35	832	862	955	27·7	28·7	27·3
Netherlands	515	500	486	15,393	16,884	14,387	29·9	33·8	29·6
Poland	11,478	11,225	9,619	197,116	197,394	175,860	22·4	17·6	18·3
Portugal	665	665	671	5,372	5,294	4,392	8·1	8·0	6·5
Roumania	651	659	793	10,196	9,206	9,263	15·7	14·0	11·7
Sweden	870	872	903	25,354	22,678	20,959	29·1	25·0	23·2
Switzerland	48	55	51	1,646	1,693	1,576	34·3	30·8	30·9
Czechoslovakia	2,125	2,174	2,202	51,813	51,098	43,338	24·5	23·5	19·7
Total Europe	39,317	38,353	36,711	813,573	711,946	694,477	22·2	18·6	18·9
Canada	1,448	2,105	802	26,937	32,373	11,066	18·6	15·5	13·8
United States	5,234	6,210	5,465	64,774	95,497	70,426	12·4	15·4	12·9
Argentina	315	207	179	3,701	2,155	923	11·8	10·4	5·2
GRAND TOTAL	46,314	46,875	43,157	908,985	841,971	776,892	20·9	18·0	18·0

POTATOES

Countries	1923	1922	Average 1917-21
	bush.	bush.	bush.
Germany	1,156,317,000	1,494,195,000	922,148,000
Austria	47,384,000	51,378,000	25,112,000
Belgium	88,853,000	144,454,000	86,126,000
Bulgaria	1,220,000	1,360,000	1,311,000
Denmark	44,000,000	49,249,000	44,213,000
Spain	95,497,000	108,598,000	104,024,000
Lithuania	28,981,000	26,373,000	22,081,000
Finland	15,800,000	16,009,000	19,231,000
England and Wales	99,157,000	149,781,000	122,394,000
Hungary	63,044,000	48,491,000	61,022,000
Italy	62,464,000	53,690,000	59,654,000
Lithuania	55,171,000	67,902,000	43,597,000
Luxemburg	6,173,000	7,007,000	5,046,000
Norway	28,610,000	32,699,000	32,728,000
Netherlands	81,947,000	136,623,000	102,388,000
Poland	1,055,213,000	1,221,588,000	(a)635,650,000
Sweden	61,252,000	74,788,000	68,692,000
Switzerland	63,292,000	24,820,000	30,898,000
Czechoslovakia	231,065,000	333,235,000	171,441,000
Total Europe	3,285,440,000	4,042,240,000	2,557,756,000
Canada	101,777,000	92,908,000	110,198,000
United States	416,720,000	451,185,000	381,876,000
Alaska	863,000	2,146,000	1,317,000
GRAND TOTAL	3,804,800,000	4,588,479,000	3,051,147,000

a The year 1921.

In the above table, showing details of the world's acreage and production of wheat, there are some differences from the figures given in the table published in the November-December number of the Agricultural Gazette. There are increases over former estimates for Spain, Italy, the United States and Australia, and a decrease in the estimate for Poland.

The total area sown to wheat, 217,000,000 acres is an increase of 3,000,000 acres over last year, and of 10,000,000 over the five year average. Europe shows an increase of 1,000,000 acres over last year, and North America a decrease of nearly 3,000,000 acres. A striking feature is the increase of over 1,000,000 acres in Argentina.

With official estimates received from practically all the countries in the world, excluding Russia, the total production of wheat in 1923 is shown to be 3,461,000,000 bushels against 3,110,000,000 in 1922 and 2,903,000,000 bushels the average of the five years 1917-21, an increase of 351,000,000 bushels over last year and 558,000,000 over the five year average. The yield per acre for the five year period is 14 bushels. It was 14·5 for 1922 and 15·9 for 1923.

The total production in Europe is 1,285,000,000 bushels, an increase of 243,000,000 over last year and of the same amount over the five year average. North America shows a decrease of 6,000,000 bushels from last year, North Africa an increase of 39,000,000 bushels, South America an increase of 62,000,000, and Australasia an increase of 12,000,000.

In a recent cable the Institute states that "the estimated exportable surplus of wheat in all the exporting countries for the current grain year is 950 million bushels and the estimated requirements of the importing countries amount to 717 million bushels."

These import figures, given as prospective for the current year, are the actual ones for the preceding year, but the exportable surplus figures are merely theoretical and take no account of unmerchantable grain or waste and of the necessary normal carry-over. In Canada, official inspections from September 1st to December 10th show only 85·32 per cent of contract grade wheat compared with 92·40 per cent to same date last year. If the Canadian grades continue in the same proportion, over 14 per cent will have to be deducted from the total shipments from the farms, and it is known the producers will not ship wheat believed to be under grade and even of a grade that will be more profitable as hog and poultry feed. The United States do not report under-grade wheat at the terminal markets, but it is recognized that even a larger proportion is non-contract or retained on the farm for feed. It is estimated 11½ per cent is being retained there for the latter purpose. Hence, even assuming that the official reports of other exporting countries do not comprise so large a proportion of under-grade or waste wheat, the theoretical surplus inferred from the Institute report as carry-over Augsut 1st next, viz., 233 million bushels, will decrease to the requisite normal for immediate home needs. Probably this will be the case if the exports for the current year are to approximate those of the preceding year; and actual exports to November 24th run only 11 million bushels behind them, notwithstanding the late movement of the Canadian crop. The imports to Great Britain to same date are 13 million bushels ahead of last year's.

The comparative failure of the potato crop in Europe has profoundly modified the European demand for wheat. For Europe alone, excluding Russia, (also France not yet reported), there is a shortage of nearly 797 million bushels. The shortage in some of the most important wheat importing countries is significant. The figures for 1923 are given first, and those for 1922 in brackets, followed by the amount of decrease; Germany, 1,156,317,000, (1,494,195,000), 337,878,000 bushels; Belgium, 88,853,000 (144,454,000), 55,000,000; England and Wales 99,157,000 (149,781,000), 50,624,000, Holland, 81,947,000, (136,623,000), 54,676,000; Czechoslovakia, 231,065,000 (333,235,000), 101,670,000. The decreases for these five countries amount to 599,849,000 bushels. Poland, usually an exporter to Central Europe, decreased its production by 166,375,000 bushels.

It is true that the total European crop for 1923, although 757 million bushels smaller than the previous year's, was still 727,684,000 bushels larger than the average of the years 1917-21 when, in consequence of the war, hoed crops were reduced to a minimum. On the other hand, in the huge European potato crop of 1922, coincident with a small wheat crop, there is some explanation of the fact that wheat imports were much under the theoretical supplementary requirements estimated for normal annual consumption. Theoretically there was expected a European import 200 million bushels larger than the previous year's whereas there was an actual increase of only 15 million. This year, with an increase of 243 million bushels in the European wheat crop but a drop of 757 million bushels (so far reported) in potatoes, there is one explanation why wheat exports so far reported are almost equal to those of the same date last year and give good promise of a world's total approximating last year's. Although the production of European rye is about 100 million bushels greater than that of the preceding year, this will not materially arrest the satisfactory progress of wheat imports already firmly established.

Our communication to the November-December issue of the Agricultural Gazette, made on November 20th, forecast total

import requirements of 682 million bushels (Europe, 562 million; ex-Europe, 120 million) against 632 million, estimated by Mr. Broomhall about that time. The latter, in his issue of December 4th, raised his estimate to 688 million bushels of which 128 million ex-Europe.

If imports should continue at the rate established since the beginning of the current grain year, Mr. Broomhall estimates they will reach a total of 724 million bushels. As part of the imports are not at all or only tardily recorded, it is not improbable that the theoretical total of 717 million mentioned by the Institute will eventually be approximated.

FOREIGN CROP CONDITIONS

(December 20, 1923)

Great Britain.—Seeding of winter wheat was practically completed by December 1st. A slight decrease in acreage is indicated. November weather was very wet, which hindered seeding somewhat.

Germany.—The second half of October was very wet and seeding was delayed. November was favourable to the development of winter wheat and rye and their condition was above average. There is reason to believe that the acreage is at least as large as last year.

France.—The appearance of winter crops on December 1st was good. They have made a very promising start.

Italy.—At the end of November the weather was warm and rainy. Reports regarding the growing crops were satisfactory.

Roumania.—There are complaints of drought, but in the majority of districts the wheat acreage has been maintained.

Jugoslavia.—Autumn sowings were brought to a close about the end of October. At the end of November further heavy rains were reported, and the crops were in good condition.

Bulgaria.—Preparatory field work was delayed owing to the lack of moisture, and sowings were started under unfavourable conditions.

Spain.—Timely rains enabled seeding to be terminated under very fair conditions, but the moisture supply was still regarded as inadequate.

Russia.—A *Times* correspondent asserts that the Soviet Agricultural Commissariat has received information that sowings of winter grain have been reduced 25 to 50 per cent owing to drought, and in some parts partial famine prevails.

North Africa.—At the end of November the agricultural situation showed considerable improvement in Algeria, Tunis and Morocco.

India.—In the first part of November there were complaints of lack of moisture in the big wheat growing regions of the North. Later the outlook was described as favourable in the Central Provinces, and normal to good in the United Provinces. It is expected that the wheat acreage will be less than that of last year.

Australia.—Harvest weather was favourable and the wheat crop was turning out well.

Argentina.—It rained heavily in the South during the last week of November and some damage to the wheat crop was reported. Elsewhere the weather was very favourable. With reference to the heavy rains reported in Argentina, it may be recalled that the wheat crop of 1920 was probably reduced, in some degree, by this cause. Rains were experienced over a wide area in the first half of December of that year, and although little importance was attached to them at the time, yet the Government were eventually obliged to reduced the total estimate of the crop from 184 million to 156 million bushels.

UNITED STATES FINAL CROP REPORT.

The December estimates of the Crop Reporting Board of the United States Department of Agriculture of the acreage, production and value (based on prices paid to farmers on December 1) of the important farm crops of the United States in 1921, 1922 and 1923, based on the reports of correspondents and field statisticians. The figures here published for both 1922 and 1923 have been revised on the basis of the latest and fullest information now available. The revised figures here shown, and not the unrevised figures previously published, should be compared to obtain the proper relation of the 1923 acreage and production to that of 1922 and earlier years. The figures follow:—

Crop	Acreage	Production		Farm Value December 1	
		Per acre	Total	Per unit	Total
				cents	$
Corn, 1923, bushels	104,158,000	29·3	3,054,395,000	72·7	2,222,013,000
1922	102,946,000	28·3	2,906,020,000	65·8	1,910,775,000
1921	103,740,000	29·6	3,068,569,000	42·3	1,297,213,000
Winter Wheat, 1923, bushels	39,522,000	14·5	572,340,000	95·0	543,825,000
1922	42,358,000	13·8	586,878,000	104·7	614,399,000
1921	43,414,000	13·8	600,316,000	95·1	571,044,000
Spring Wheat, 1923, bushels	18,786,000	11·4	213,401,000	85·1	181,676,000
1922	19,959,000	14·1	280,720,000	92·3	259,013, 00
1921	20,282,000	10·6	214,589,000	85·6	183,790,100
All Wheat, 1923, bushels	58,308,000	13·5	785,741,000	92·3	725,501,000
1922	62,317,000	13·9	867,598,000	100·7	873,412,000
1921	63,696,000	12·8	814,905,000	92·6	754,834,000
Oats, 1923, bushels	40,800,000	31·8	1,299,823,000	41·5	539,253,000
1922	40,790,000	29·8	1,215,803,000	39·4	478,948,000
1921	45,495,000	23·7	1,078,341,000	30·2	325,954,000
Barley, 1923, bushels	7,905,000	25·1	198,185,000	54·0	106,955,000
1922	7,317,000	24·9	182,068,000	52·5	95,560,000
1921	7,414,000	20·9	154,946,000	41,9	64,934,000
Rye, 1923, bushels	5,157,000	12·2	63,023,000	64·7	40,804,000
1922	6,672,000	15·5	103,362,000	68·5	70,841,000
Buckwheat, 1923, bushels	737,000	18·9	13,920,000	93·3	12,984,000
1922	764,000	19·1	14,564,000	88·5	12,889,000
1921	680,000	20·9	14,207,000	81·2	11,540,000
Flax seed, 1923, bushels	2,061,000	8·5	17,429,000	210·8	36,733,000
1922	1,113,000	9·3	10,375,000	211·5	21,941,000
1921	1,108,000	7·2	8,029,000	145·1	11,648,000
Rice, 1923, bushels	892,000	37·3	33,256,000	110·3	36,686,000
1922	1,055,000	39·2	41,405,000	93·1	38,562,000
1921	921,000	40·8	37,612,000	95·2	35,802,000
Potatoes, White, 1923, bushels	3,941,000	108·1	412,392,000	92·3	339,322,000
1922	4,307,000	105·3	457,396,000	58·1	263,355,000
1921	3,941,000	91·8	361,659,000	110·1	398,362,000
Sweet Potatoes, 1923, bushels	993,000	97·9	97,177,000	97·9	95,091,000
1922	1,117,000	97·9	109,394,000	77·1	84,295,000
1921	1,066,000	92·5	98,654,000	88·1	86,894,000
Hay, tame, 1923, tons	60,162,000	1·48	89,098,000	$14·07	1,253,364,000
1922	61,159,000	1·57	95,882,000	$12·56	1,204,101,000
1921	58,769,000	1·40	82,379,000	$12·11	997,527,000
Hay, wild, 1923, tons	15,722,000	1·11	17,528,000	$ 7·85	137,603,000
1922	15,871,000	1·02	16,131,000	$ 7·14	115,176,000
1921	15,632,000	0·98	15,391,000	$ 6·63	101,991,000
All Hay, 1923, tons	75,884,000	1·41	106,626,000	$13·05	1,390,967,000
1922	77,030,000	1·45	112,013,000	$11·78	1,319,277,000
1921	74,401,000	1·31	97,700,000	$11·25	1,099,518,000
Tobacco, 1923, lbs	1,820,000	810·0	1,474,786,000	20·3	298,936,000
1922	1,695,000	736·0	1,246,837,000	23·2	289,248,000
1921	1,427,000	750·0	1,069,693,000	19·9	212,728,000
Cotton, 1923, bales	3,742,000	128·8	10,081,000	31·0	1,563,347,000
1922	33,036,000	141·5	9,761,817	23·8	1,161,846,000
1921	30,509,000	124·5	7,953,641	16·2	643,933,000
Cottonseed, 1923, tons	.....	.....	4,476,000	$42·92	205,538,000
1922	.....	.....	4,336,000	$40·18	174,220,000
1921	.....	.....	3,531,000	$29·15	102,929,000
Clover Seed, 1923, bushels	800,000	1·5	1,233,000	$12·19	15,027,000
1922	1,156,000	1·6	1,887,000	$10·05	18,971,000
1921	889,000	1·7	1,538,000	$10·75	16,529,000
Sugar Beets, 1923, tons	651,000	10·59	6,893,000	$7·24	49,890,000
1922	530,000	9·77	5,183,000	$7,91	41,016,000
Beet Sugar, 1923, tons	651,000	1·36	884,000	.....	.....
1922	530,000	1·27	675,000	.....	.....
Cane Sugar, Louisiana, 1923, tons	228,000	1·35	169,000	.....	.....
1922	241,000	1·22	295,000	.....	.....
Maple Sugar and Syrup (as Sugar), 1923, lbs	15,291,000	2·19	33,523,000	23·2	7,780,000
1922	16,274,000	2·11	34,263,000	21·9	7,504,000
Sorghum Syrup, gallons 1923	380,000	84·2	32,001,000	86·2	27,595,000
1922	447,000	81·5	36,440,000	71·0	25,855,000
1921	518,000	88·0	45,566,000	62·9	28,681,000

PRODUCTION AND INTERNATIONAL TRADE IN FERTILIZERS.

The International Institute of Agriculture has just issued a leaflet reproducing the tables of data on the production and trade in fertilizers and chemical products useful in agriculture published in the International Year Book of Agricultural Statistics for 1922. The following is a summary of the data presented in the tables.

Phosphatic Fertilizers.—The crisis brought about by the war, in the production of *natural phosphates*, the effects of which were already seen to be greatly reduced in the results of the mining seasons 1920 and 1921, may be said to have been completely surmounted in 1922.

The phosphate-producing countries of North Africa (Tunis, Algeria, Egypt and Morocco) yielded in 1922 altogether 2,583 thousand metric tons of phosphates, reaching almost the maximum production of 1913, which amounted to 2,736 thousand metric tons. Even though the yields of Tunis and of Egypt are still below their pre-war level, those of Algeria show an increase, whilst the mines of Morocco, which began work in 1921, had in 1922 already produced considerable quantities of phosphates. Thus, utilizing also the stocks remaining at the end of 1921, North Africa was able in 1922 to export 2,668 thousand tons of natural phosphates, surpassing any previous year.

In the United States, the production of phosphates in 1922 shows a diminution (2,457 thousand tons in 1922, as against 3,161 thousand in 1913); and the exports of this product show even a greater reduction (731 thousand metric tons in 1922, as compared with 1,388 thousand in 1913).

Regarding imports, the increasing arrivals in Germany during the years 1920, 1921 and 1922 are worthy of particular note, as also are the imports of Denmark, of France and of Italy and of the Netherlands, all of which exceeded those of 1913. On the other hand, the imports into Great Britain and Ireland and into Sweden show a decrease.

Salient among the data available as to the production of *superphosphates* in 1922, are those of France—the largest producer in Europe—which show a considerable increase over the pre-war yield; the actual production in 1922 being 2,133 thousand metric tons, a figure never hitherto attained by the French industry.

Showing a great increase on 1921, is also the 1922 yield of Germany,—which, nevertheless, was only equal to one-third of the pre-war production—, together with the yields of Great Britain and Ireland and of Belgium, the last named country's yield being very little below that of 1913—, and also the production of Denmark, which resulted even considerably above the pre-war level.

The leader among the world's superphosphate-exporting countries in 1922 was Belgium, while Germany—a large exporter previous to the war—was one of the principal importing countries.

The production of *Basic slag* in 1922 showed a very marked increase on 1921 in France, Luxemburg, Great Britain and Ireland, and Germany. While Germany produced in 1922 a quantity equal to but half of that produced before the war, Luxemburg went beyond the pre-war yield, and France and Great Britain made great strides towards attaining it.

In the aggregate, however, taking into account the great diminution in the German yield, the world's output of basic slag was in 1922 below that of 1913. Germany's yield was so deficient that, whilst in 1913 the country's net exports of basic slag came to 270,000 metric tons, in 1922 she was buyer of an equal quantity, occupying first place among the importing countries.

Notwithstanding, the Netherlands and Great Britain and Ireland show an increase in their net imports of basic slag during 1922, as compared with the pre-war years; while Italy, Norway and Sweden show a decrease. The leading basic slag furnishing countries in 1922 were France and Belgium, whose total exports in that year showed a notable increase on those of 1921 and of 1913.

The *prices* of natural phosphates in the United States had in 1922 declined considerably, but in Algeria and Tunis they had risen above those of 1921 and the preceding years, and were more than double the 1913 prices.

Basic slag quotations in Belgium and France, since attaining their highest point in 1920, have had a constant tendency to decline, though still keeping at a level four times as high as in 1913.

Potash Fertilizers.—The potash industry, which in 1921 had already practically regained its pre-war position, continued in the following year to make even more notable progress. Germany, France and Poland yielded in 1922 altogether 1,512 thousand metric tons of potashes, expressed in K_2O, as compared with 1,070 thousand in 1921, and 1,168 thousand in 1913. The German mines alone delivered in 1922 about 380 thousand metric tons more than in the preceding year, exceeding by about 200 thousand metric tons the respective 1913 output, the greatest previously obtained and which included Alsace.

The German exports in 1922 did not reach their pre-war level; but, in compensation, home-consumption increased considerably.

France had in 1922 more than doubled her 1921 exports of potash fertilizers. Norway, the Netherlands, Sweden and the United States showed, on the other hand, a notable increase in imports on those of 1921, without, however, arriving at the pre-war figures.

The *price* of raw potashes in France, from May, 1921 onwards, kept constant at 43 centimes per unit; whilst in Germany sharp rises took place during 1922, due essentially, to the course of the exchange.

Nitrogenous Fertilizers.—The great transformation commenced in the nitrogenous fertilizer industry, — brought about by necessity, and the consequences of the war—, continued and was accentuated during 1922.

The yield of *nitrate of soda* in Chili came to 1,068 thousand metric tons, against 1,321 thousand in 1921. Thus it is seen that in 1922 the production was lower than in 1909 upwards, and not nearly half the yield obtained in 1913. The exports of nitrate of soda from Chili in 1922 were greater than those of 1921, and are still much less than half the exports of the last pre-war year.

The countries registering notable increases in imports of nitrate of soda in 1922 as compared with 1921, are Germany, Italy, Poland, the United States, Japan, and Egypt. Belgium, France and Spain, on the other hand, show a great decrease.

The amount of *nitrate of lime* produced by Norway continued to increase in 1922, reaching a maximum of 156,000 metric tons, as compared with 130,000 in 1921, and 73,000 in 1913. Likewise the Norwegian exports, which from 71,000 metric tons in 1913 and from 82,000 in 1921, rose to 158,000 metric tons in 1922.

As regards *cyanamide of calcium*, data showing production in 1922 are not forthcoming for a number of countries. Among the data available, worthy of particular note are those of the French out-turn, which, from 13,707 metric tons in 1920-21, increased to 29,000 in 1921-22 and to 42,000 in 1922-23.

Germany produced 238 thousand metric tons in 1922, as compared with 250 thousand in 1921, and 48·5 thousand in 1913.

Of special interest among the data dealing with *sulphate of ammonia*, are those concerning the 1922 yield in Germany, which amounted to 1,191 thousand tons, more than double that of 1913; also those for the United States, whose 1922 output of 474 thousand metric tons exceeded that of any previous year, and showed a threefold increase on the pre-war production.

The United States were therefore able, in 1922, to export about 150,000 metric tons of sulphate of ammonia, thus becoming the world's most important exporter of this fertilizer, surpassing even Great Britain and Ireland, who, heading the list in 1913 with exports of 328,000 metric tons, had in 1922 reduced the quantity sent abroad to 148,000 metric tons.

The principal importers of sulphate of ammonia in 1922, were Japan,—who in that year purchased from abroad 93 thousand metric tons—, and Spain, France and the Dutch East Indies, who each imported 70 to 75 thousand metric tons.

The *prices* of sulphate of ammonia in England remained, in 1922, generally below those of the preceding year; but there was quite an opposite tendency in the quotations on American markets.

Sulphur.—The Italian production in 1922 fell to 172 thousand metric tons, from 274 thousand in 1921 and 385 thousand in 1913. Exports, however, increased considerably as compared with 1921, a year of intense crisis in the sulphur trade of Sicily.

The United States, in 1922, maintained their sulphur out-turn (1,860 thousand metric tons) at almost its highest level, which was attained in the previous year, exceeding the 1913 yield by about 1,350 metric tons. The exports from the United States in 1922 amounted to 496 thousand metric tons, a figure never previously reached.

Regarding the countries which notably increased their imports of sulphur during 1922, both as compared with 1921 and with 1913, Germany, France, Great Britain and Ireland, Sweden and Canada may be mentioned.

The *prices* of sulphur, both in Italy and in the United States, were in 1922 fixed at a much lower level than in 1921. In the United States the monthly quotations were even below those obtaining before the war.

Sulphate of copper.—The yield of this product was for 1922 higher than for 1921 in France and in Great Britain and Ireland; but, whereas the French production showed a notable increase on the pre-war out-turn, the yield of Great Britain and Ireland resulted in a great decrease. Concerning the United States, data for 1922 are unavailable, but those for 1921 indicate a great diminution in production, especially in comparison with 1913.

Data relative to the Italian yield in 1922 are likewise unavailable; it may be affirmed however, that the recent extension of manufacturing plant now gives this country the lead as regards the copper-sulphate producing capacity.

The *prices of* sulphate of copper on the English market in 1922 showed a general tendency to decline.

LIVE STOCK STATISTICS.

NUMBERS OF LIVE STOCK IN ROUMANIA

Classification	Number		Increase (+) or decrease (−)	
	1922	1921	In number	Per cent
Horses	1,802,051	1,686,728	+ 115,323	+ 6·8
Mules	2,846	2,221	+ 625	+28·1
Asses	10,143	10,621	− 478	− 4·5
Cattle	5,745,534	5,520,914	+ 224,620	+ 4·1
Buffaloes	186,676	200,256	− 13,580	− 6·8
Sheep	12,320,569	11,194,047	+1,126,522	+10·1
Goats	551,712	573,900	− 22,188	− 3·9
Swine	3,146,806	3,132,004	+ 14,802	+ 0·5

SCOTLAND

Classification	Number		Increase (+) or decrease (−)	
	June 3, 1923	June 3, 1922	In number	Per cent
Horses	203,372	211,679	− 8,397	− 4·0
Cattle	1,190,033	1,146,807	+43,226	+ 3·8
Sheep	6,762,798	6,684,097	+78,701	+ 1·2
Swine	184,925	150,884	+34,041	+22·6

DENMARK

Classification	Number		Increase (+) or decrease (−)	
	July 16, 1923	July 15, 1922	In number	Per cent
Horses	561,531	575,773	− 14,242	− 2·5
Cattle	2,537,393	2,525,348	− 12,045	+ 0·5
Sheep	374,296	441,875	− 67,579	−15·3
Goats	41,874	44,024	− 2,150	− 4·9
Swine	2,852,826	1,899,019	+953,807	+50·2
Poultry	20,000,000	19,200,000	+800,000	+ 4·2

ARGENTINA

Classification	Number		Increase (+) or decrease (−)	
	December 31, 1922	June, 1914	In number	Per cent
Cattle	37,064,850	25,866,763	+11,198,087	+43·3
Sheep	30,671,841	43,225,452	−12,553,611	−29·0
Swine	1,436,638	2,900,585	− 1,463,947	−50·5

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Deputy Minister.....J. H. Grisdale, B.Agr., D.A.Sc.

Assistant Deputy Minister and Secretary.....Lt.-Col. A. F. L. Jarvis, I.S.O.

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Functions—To develop the live stock industry through the use of superior stock; to improve marketing facilities; to administer The Live Stock and Live Stock Products Act.

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Functions—To develop the dairy industry; to inspect public cold storage warehouses; to carry on shipping experiments; to administer Dairy enactments.

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Functions—To develop the fruit industry; to enforce the Inspection and Sales Act as it relates to fruit, fruit packages and potatoes; to enforce The Root Vegetables Act; to adjust transportation difficulties.

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Functions— To represent Canada at the International Institute of Agriculture at Rome; to publish world agricultural information and statistics; to maintain the departmental library.

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Functions—To publish "The Agriculture Gazette;" to distribute departmental publications; to prepare and issue other publicity matter.

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